Systematic revision of *Tricholabiodes* Radoszkowski (Hymenoptera: Mutillidae)

by

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ABSTRACT

This study comprises an examination of over 4000 male specimens, including nearly all type material, a detailed study of the genitalia, and a key to the majority of the species of *Tricholabiodes* Radoszkowski. Thirty species and subspecies are redescribed and 22 new species described. The 22 newly described species are: *T. acer*, *T. alveolus*, *T. brothersi*, *T. concavus*, *T. convexus*, *T. denticulatus*, *T. disgregus*, *T. femoralis*, *T. ferrugineus*, *T. indistinctus*, *T. inornatus*, *T. longicarinatus*, *T. luridus*, *T. parallelus*, *T. paulocellatus*, *T. petiolatus*, *T. protuberans*, *T. recurvatus*, *T. sinuatus*, *T. thisboides*, *T. tortilis* and *T. trochantalis*. *Tricholabiodes semistriataeformis* Bischoff and *T. patrizii* Invrea are synonyms of *T. stigmaticus* Bischoff and *T. pallidicornis* Bischoff, respectively.

Phenograms and principal component plots were derived to clarify species status, make decisions on species limits and used to determine the morphological similarity between the species. The phenetic analysis was used only as a tool, and not a final product. For the determination of species limits, which included an analysis of 447 specimens, the continuous quantitative and coded characters were analysed separately. Forty-three continuous quantitative characters were analysed either as standardized measurements (against mesosoma length) or as ratios (32), since it was not possible, even via gap coding, to code these characters. Scatterplots and a phenogram from the principal components and cluster analyses respectively, are presented. Size and shape were not particularly helpful characters in determining species limits. One hundred and twenty five coded characters were analysed in a cluster analysis and part of the final phenogram is presented. For the determination of morphological similarity between the species, a hypothetical specimen, typical of each species, was derived. Again, one hundred and twenty-five coded characters were analysed in a cluster analysis and the final phenogram is presented.

Representatives from each of the species and subspecies were examined with respect to 93 coded characters. The character states were polarised using the outgroup *Dasylabroides* André. Where *Tricholabiodes* had all states occurring in *Dasylabroides*, and the primitive state could not be identified, these characters, and their states, were considered for the entire tribe, and the sister tribe of Dasylabrini, Sphaeropthalmini, was taken as the outgroup. The cladograms were constructed with the software Hennig86. The most variable characters were eliminated from the analysis. Selection of the cladogram representing the most likely phylogeny of the genus was based on parsimony, resolution of the tree, character placement on the tree, comparison of the tree with weighted/unweighted consensus trees and

biogeography. The phylogeny presented, which is to be regarded only as a hypothesis, suggests that *Tricholabiodes* underwent nine separate radiations. The southern African species are divided into two lineages: the first divergence stems from the base of the tree while the more recent lineage stems from the apex.

Evidence suggests that the genus arose in central Africa, spreading south (twice) into southern Africa, north into North Africa, west across central North Africa and east into southeastern Asia. The study has also shown that the majority of the species are restricted in their distribution, with none of the Palaearctic species occurring in southern Africa, and vice versa. It is hypothesised that the present distribution of the genus is partially restricted by dispersal ability and climate.

PREFACE

The work described in this thesis was carried out in the Department of Zoology and Entomology, University of Natal, Pietermaritzburg, from January 1993 to June 1998, under the supervision of Professor Denis J. Brothers of the University of Natal, Pietermaritzburg.

These studies represent original work of the author. Except for a preliminary study during my Honours year (1992), these studies have not otherwise been submitted in any form for any degree or diploma to any university. Where use has been made of the work of others it is duly acknowledged in the text.

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1. INTRODUCTION

The aim of this study was to provide a comprehensive revision of the systematics of *Tricholabiodes* Radoszkowski, 1885 (Sphaeropthalminae, Dasylabrini). To attain this objective two main aspects were investigated. The first was to review the species and to acquire a sound knowledge of their identity. The second was to gain an understanding of the relationships between the species.

Tricholabiodes belongs to the subfamily Sphaeropthalminae, tribe Dasylabrini. This subfamily consists of two tribes, Dasylabrini and Sphaeropthalmini. Dasylabrini consists of eight genera which together do not possess any particular derived characteristics, indicating that it may not be a holophyletic group (Brothers 1975). Brothers (1975) is of the opinion that Dasylabrini represents those members of the Sphaeropthalmini that do not fall into the holophyletic tribe Sphaeropthalmini, thus representing a paraphyletic group. The current placement of this genus, a topic that is beyond the scope of this study, has been accepted.

Tricholabiodes, like other mutillid wasps, shows extreme sexual dimorphism with the males being winged while the females are wingless. The differences in morphology and coloration between the male and female are such that it is only possible to associate the two sexes of the same species if one is able to catch them *in copulo*. Thus, for a majority of the species only one sex has been identified. Most probably, the two sexes of the same species are described under different names.

Tricholabiodes, one of several genera of nocturnal mutillids, is restricted to the arid and semi-arid regions of Africa and the Palaearctic. Its distribution in southern Africa includes all four desertic biomes: Nama Karoo, Succulent Karoo, Desert and arid parts of the Savanna, which represent more than half of the area of the subcontinent, covering the western coastal belt between 12°S and 33°S and extending into the Kalahari basin and central Karoo plateau as far as 33°E (Bayliss & Brothers 1996). This genus has a broad distribution across North Africa, with specimens recorded from Senegal to Somalia. Its easternmost recorded distribution is from Rajasthan, India.

All previous work on the systematics of *Tricholabiodes* consisted of descriptions of new species, redescriptions and/or distribution records. The original descriptions, particularly those written towards the end of the nineteenth and the beginning of the twentieth century, are vague, usually without illustrations, and thus inadequate for recognition of the species described. Although several keys (Bischoff 1920; Lelej 1985; Suárez 1990) have been produced they do not account for all intraspecific

variation and never included all previously described species. Bischoff (1920) superficially revised the genus, describing several new species from southern Africa, but his work has several shortcomings: his descriptions are extremely brief, and he did not familiarize himself with the majority of the type material. Suárez (1990) provided the first major attempt at revising the genus, but due to his untimely death was unable to complete the paper. The manuscript was put together by Nonveiller (Suárez 1990).

The present study is the first to include an examination of nearly all type material, a detailed study of the genitalia and a key to the majority of the species. Besides the redescription of 33 species and subspecies, there are 22 newly described species (Appendix I), all based on adult males only. Species for which only the female is known have been ignored, while for species for which both sexes are described, only the male is redescribed here. Adequate revision of the females was impossible because of insufficient material. Only about 200 female specimens, either collected or loaned, could be assembled, compared with approximately 4000 males.

In accordance with the International Code of Zoological Nomenclature (1985: Article 31.b), if the specific name of a species is or ends in a Latin adjective or a participle in the nominative singular, it must agree in gender with the generic name with which it is at any time combined. If the termination of the species name is incorrect, the specific name must be corrected accordingly (International Commission on Zoological Nomenclature 1985: Article 34.b). *Tricholabiodes*, according to the International Code of Zoological Nomenclature (1985: Article 30.b), is masculine. Radoszkowski (1885), in proposing the genus, treated it as masculine when describing his first species, *T. asiaticus* Radoszkowski. The genus is thus consistently treated as masculine here.

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I wish to thank numerous friends, too many to mention, for their support and encouragement during the duration of this study; to others for their hospitality during my travels through the southern and northwestern Cape and Namibia; to the academic members of the Department of Zoology and Entomology, Pietermaritzburg, who freely gave advice; to Miss Olive Anderson, for her assistance with my diagrams; and in particular, my parents, John and Jo, and my brother, David, whose encouragement, patience, support and unfailing belief in my ability enabled me to complete this study.

3. HISTORICAL REVIEW OF *TRICHOLABIODES*

There has being no previous attempt to estimate the phylogeny of *Tricholabiodes* nor to provide a complete monographic description of all species of the genus.

Radoszkowski (1876, 1885, 1887, 1893), André (1898, 1899, 1901, 1903, 1909a, 1909b, 1910), Bischoff (1920), Invrea (1932a, 1932b, 1965), Suárez (1963, 1967, 1977, 1990), Lelej & Kabakov (1980, 1981) and Lelej (1985, 1995), are credited for making the most significant contributions to the knowledge of this genus, through the descriptions of new species, or the redescriptions of old.

Tricholabiodes was formally proposed as a genus by Radoszkowski (1885) when he redescribed *T. pedunculatus* (Klug, 1829), designating it as the type species. Radoszkowski (1885) also described *T. asiaticus* Radoszkowski, male. In his description of both species Radoszkowski made particular reference to body colour, body shape, pubescence colour, puncture distribution and genitalia. He was one of the first systematists to realize the importance of genitalia characters in Hymenopteran, particularly mutillid, systematics.

André (1896a) regarded six genera described by Radoszkowski (1885) as subgenera of *Mutilla*. André regarded Radoszkowski's characters, used in the generic descriptions, as superficial, with the more taxonomically important characters ignored. André regarded subgenus *Tricholabiodes*, with particular reference to *Mutilla* (*Tricholabiodes*) *pedunculata* Klug, *M.* (*T.*) *chlorotica* Gribodo and *M.* (*T.*) *asiatica* Radoszkowski, to be very similar to the subgenus *Pseudophotopsis* André. *Tricholabiodes* differed only by having the propodeum unarmed, pterostigma on the forewing small, third submarginal cell open and the metasoma more elongate. It was only several years later, that André (1902) recognized *Tricholabiodes* at the genus level.

Péringuey (1898) was the first to describe southern African species of *Tricholabiodes* (as *Mutilla semele* and *M. thisbe*), although it was André (1901, 1902) who assigned them to the correct genus. Bischoff (1920) revised the southern African representatives, recognizing 11 species: two identified from both sexes, eight from males only and one from a female only. Six of the species were newly described. He discredited Péringuey's (1898) descriptions, saying they were superficial and inadequate as well as making it extremely difficult for another systematist to work on mutillids of the Western Cape (Bischoff 1920). Bischoff (1920), during his revision, misspelt *Tricholabiodes*, spelling it as *Tricholabioides*. The majority of the authors who have since referred to this genus, including Invrea and Suárez, have

adopted the incorrect spelling of *Tricholabiodes*. Only Brothers (1975), Lelej & Kabakov (1980, 1981) and Lelej (1985, 1995) have used the correct spelling.

Invrea (1932a, 1932b, 1965) described several species and provided several distributional records (Invrea 1936, 1952, 1962). He never provided a key to, or attempted a revision of, the genus.

Suárez's (1963, 1967, 1977, 1990) research on the genus is the most significant. His descriptions are thorough, consistent and comparable. He is one of the few authors, besides Radoszkowski (1885, 1893) and Skorikov (1935), who referred to genitalic characters. It is unfortunate that Suárez was never able to finish his revision of the genus. The manuscript, completed by Nonveiller (Suárez 1990), excludes 50% of all described species, including all southern African representatives. The catalogue, listing all described species of *Tricholabiodes*, appended towards the end of the manuscript, is incomplete. Certain drawings are incorrectly labelled, genitalic drawings of species not described in the manuscript have no information about the specimens whose genitalia were illustrated. Only the species described in the manuscript can be keyed out using the key.

The taxonomic status of *T. pedunculatus* (Klug) ♂, and *T. semistriatus* (Klug) ♂, particularly with the incorrect synonymising of these two species by André (1903), has caused immense confusion in the literature. The species were described by Klug (1829) as *Mutilla semistriata* ♀, and *M. pedunculata* ♂, respectively. André (1903) assumed *T. pedunculatus* ♂, to be a junior synonym of *T. semistriatus* ♀, since these two species were both collected from the same locality. Several authors, including Magretti (1905), André (1910), Bischoff (1920) and Invrea (1932a, 1936, 1952, 1965), accepted, without question, André's (1903) synonymy. Suárez (1963) initially regarded *T. semistriatus* ♀, and *T. pedunculatus* ♂, to be different sexes of the same species because of their overlapping distributions and correlation of their characters. Several years later, Suárez (1977) suggested that *T. sudanensis* ♂, Suárez, and not *T. pedunculatus* ♂, is the male of *T. semistriatus* ♀, because of similarity in characters. Suárez (1977, 1990) proposed no further nomenclatural changes except for the rejection of the synonymy of *M. semistriata* ♂, and *M. pedunculata* ♀, thereby recognizing *T. semistriatus* and *T. pedunculatus* as distinct species.

Lelej & Kabakov (1980, 1981), and Lelej (1985, 1995) described six new species from central Asia: *T. beludzhistanus* Lelej ♂, *T. mandibularis* Lelej ♂, *T. pallidus* Lelej ♂, *T. nuristanus* Lelej ♂, *T. nursei* Lelej ♀ & ♂, and *T. tharensis* Lelej ♀ & ♂. These species have been so briefly characterized that correct determination is practically impossible. Explanation of the diagnostic characters is

insufficient and no drawings are provided. Unless the holotype or a correctly identified specimen is used with the description, it is almost impossible to identify the above six species using only the descriptions or the key (Lelej 1985). Lelej, fully aware of the inadequacies of his previous descriptions, provided drawings of the genitalia and other distinguishing characters for two new species described later (Lelej 1995).

Before this study, 40 species of *Tricholabiodes* were described. Seven species were described only from females, while five species, *T. tharensis* (Lelej 1995), *T. nursei* (Lelej 1995), *T. asiaticus* (Radoszkowski 1885, 1887), *T. carinifer* Bischoff (as *T. thisbe* Péringuey, Bayliss & Brothers 1996) and *T. lividus* André (as *T. livida*, Bayliss & Brothers 1996), were known from both sexes.

4. MATERIALS AND METHODS

4.1. INTRODUCTION

This study involved the examination of over 4000 specimens. Only males were studied as only a limited number of female specimens could be obtained (about 200). Although the females could be grouped into morphospecies, the small sample provided was inadequate for the determination of their morphological variability.

All available type material was examined during the course of the study, with the exception of that for *T. imbellis* (André), *T. bactrianus* Suárez, *T. chloroticus* (Gribodo), *T. carinifer* Bischoff, *T. nuristanus* Lelej, *T. denticrus* Bischoff, *T. niloticus persicus* Suárez, *T. somalicus* Suárez and *T. israeliticus* Suárez. Type material of each of these species or subspecies could not be obtained or located. Using the literature (Gribodo 1884; André 1896a; Bischoff 1920; Suárez 1967; Brothers 1983; Lelej 1985; Suárez 1990), and for *T. imbellis* photographs of the lectotype (Brothers 1983), it was possible to identify and redescribe *T. imbellis*, *T. bactrianus*, *T. chloroticus* and *T. carinifer*. *Tricholabiodes nuristanus* Lelej, *T. denticrus* Bischoff, *T. niloticus persicus* Suárez, *T. somalicus* Suárez and *T. israeliticus* Suárez, have not been redescribed, nor have they been included in any of the analyses since these species and subspecies, using all available literature (Bischoff 1920; Suárez 1967; Lelej & Kabakov 1980; Lelej 1985; Suárez 1990), could not be identified. Only paratype or paralectotype material was studied for *T. scorteccii* Invrea, *T. arabicus* Suárez, *T. mandibularis* Lelej, *T. sudanensis* Suárez, *T. pedunculatus* (Klug). *T. asiaticus* Radoszkowski, *T. tharensis* Lelej and *T. nursei* Lelej.

The terminology used for systematic concepts is a combination of that used by Sneath & Sokal (1973), and Mayr & Ashlock (1991). The morphological terms used throughout, unless otherwise specified, are from Gauld & Bolton (1988) and Huber & Sharkey (1993). The abbreviations T and S are used for the metasomal terga and sterna, respectively (e.g. T1 refers to first metasomal tergum, S1 refers to first metasomal sternum).

4.2. CHARACTER ANALYSIS

Whole specimens were viewed under a Wild M7 dissecting microscope with 20 X eyepieces. All specimens were surveyed briefly to obtain an idea of the general morphology. Initially, specimens were separated into groups or Operational Taxonomic Units (OTUs) according to differences in colour. Only after this initial separation was each specimen critically studied for characters to separate it from other specimens. Each OTU was then further studied and specimens within further separated. The placement

of specimens into OTUs was continually refined as additional characters became available. Only when the specimens could not be separated into further OTUs, were the genitalia studied.

In order for the genitalia to be studied, they had to be dissected out from the posterior end of the wasp's metasoma. The procedure used was recommended by Brothers (1992, pers. comm.[1]). After removing the locality and collection labels, insects were placed for several days inside a relaxing chamber containing water and dissolved phenol crystals. Once the insect was softened so that it could be handled without breaking any of its appendages, it was removed from the chamber and the genitalia extracted using a pin slightly hooked at the tip. The genitalia were immediately placed into cold 10% KOH (for at least 36 hours), rinsed in water, immersed in 15% acetic acid (not longer than 15 minutes), rinsed again and mounted in glycerol jelly.

Approximately 75% of all specimens studied had their genitalia dissected out. If, within an OTU, there was variation in a character, or the specimen was from a different locality, its genitalia were extracted. Even though genitalia are regarded as providing only additional characters for testing a hypothesis of specimen groupings, and are not given greater weighting than any of the other characters, it is unlikely that mutillid wasps of the same species will have vastly different genitalia. If variability occurred between genitalia of similarly grouped specimens, the grouping of those specimens was reassessed. Once all characters, including the genitalia, had been assessed, all specimens within each OTU were found to be more or less morphologically identical.

From each OTU, several specimens, selected on size, morphological variability and locality, were measured. The smallest, largest, and several average-sized specimens, as well as those from a different locality or those that displayed some qualitative morphological difference from the other specimens within the OTU, were measured. These measurements included length and/or width of various sclerites. A literature survey was done to help identify the taxonomically important features that should be measured. Each measurement was made using an eye-piece micrometer and standardized against mesosoma length. In total, 447 specimens with 43 measurements taken from each, were examined. It was hoped that the measurements would provide additional characters for separating the species and identifying species limits. Each measured specimen is identified, under the Material Examined section in each species description, by a numerical superscript preceding its label information. This superscript corresponds with the superscript placed after the species name in Appendices VII and VIII.

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4.3. PHENETIC METHODS

The aim of the phenetic analysis was to clarify species status, make decisions on species limits and determine the morphological relationships between the species. The phenetic analysis was therefore used as a tool, and not a final product.

Once all specimens were separated into their respective OTUs, the OTUs were compared with each other in an attempt to derive a list of as many quantifiable characters as possible. Geographic distribution was not used as a character in determining phenetic similarity. Sokal & Sneath (1963) believe that geographic distribution should not contribute towards an estimation of phenetic relationships but should only be used as a pointer to phylogeny. They believe that geographic distribution may reflect an accidental migration which is not governed by the genotype and is not a reliable character to use for estimating phenetic resemblance.

The 447 specimens discussed above were used in these analyses. The qualitative and discontinuous quantitative characters (referred to as coded characters) were analysed separately, using NTSYS-pc (Rohlf 1993), from the continuous quantitative characters (definition provided in Chapter 5: Description of Characters). The continuous quantitative characters were analysed by a principal component analysis (PCA) while an inter-OTU distance matrix was derived using squared Euclidean distance, and a cluster analysis was done using the unweighted pair group method with averages (UPGMA). For the coded characters an inter-OTU similarity matrix was derived using a simple matching coefficient and a cluster analysis was done using UPGMA. The coded characters were not included with the continuous quantitative characters in the ordination analyses. Refer to Chapter 6: Phenetic Analysis, for a more detailed discussion of the analysis.

4.4. CLADISTIC METHODS

Males of each species were thoroughly examined, and all characters used in the phenetic analysis were reassessed for use in the cladistic analyses. Several characters were rejected for various reasons (Appendix II). The different states of each character were coded. Plesiomorphic character states, and the polarization of the derived states were based on out-group comparison. *Dasylabroides* André was used as the outgroup; although it is believed, for reasons listed below, to be the most suitable outgroup, its status within the Dasylabrini and its relationship to *Tricholabiodes* is not clear (Brothers 1975). It is unclear whether *Dasylabroides* is the true sister-group of *Tricholabiodes* despite showing more characters in common with *Tricholabiodes* than any of the other genera within the Dasylabrini. Although all *Tricholabiodes* males are winged, some of the *Dasylabroides* males are wingless, but

appear similar to the winged males. The other genera within the Dasylabrini are all morphologically very different to *Tricholabiodes*. For example, *Brachymutilla* and *Apteromutilla* have wingless males which look virtually identical to the females, while *Stenomutilla* has no notauli furrows, a state rarely seen in mutillid wasps.

When coding the characters, the primitive state was considered to be that state that is shared with or most similar to a state in the outgroup. Several characters of *Tricholabiodes* had all states occurring in *Dasylabroides*, and therefore, the primitive state could not be identified. These characters, and their states, were then considered for the entire tribe and the sister tribe of Dasylabrini, Sphaeropthalmini, was taken as the outgroup. Besides surveying several genera of the Sphaeropthalmini, clarification on the primitive state for each of these characters was obtained from Brothers (1975) and Lelej & Nemkov (1997). This included (Appendix III) characters 6-12 (shape of free border of the clypeus), 14 (density of setae on dorsal surface of the clypeus), 21 (shape of apex of inner mandibular tooth), 22 (presence or absence of a tooth on the mesal margin of the mandible), 32 (presence or absence of ridges on the lateral margins of the dorsellum) and 92 (shape of apical 1/3 of the parameres). The state of each character occurring in the outgroup was coded as primitive and the different state/states occurring in the in-group were coded as derived. Where a possible evolutionary progression could be determined between different states of the characters within the in-group, successive derived states were defined (0 = primitive; 1, 2, 3 & 4 = successive derived states).

A list of all characters and their states used in the analysis is given in Appendix III. Appendix IV shows the distribution of character states for 52 species (including one subspecies) of *Tricholabiodes*. All data were entered into Dada, version 1.0 (Nixon 1995). Cladograms were generated using Hennig86, version 1.5 (Farris 1988), with the final printed cladograms produced in Clados, version 1.2 (Nixon 1992). Refer to Chapter 7: Phylogeny of species of *Tricholabiodes*, for a more detailed discussion of the analysis.

4.5. DESCRIPTION FORMAT

Each description consists of several sections: a complete bibliographic synonymy list, followed by a diagnosis of distinguishing characters and finally a full description comparable with all the other descriptions.

The diagnosis is a selection of the most significant characters used in recognizing each species. Certain species are morphologically very similar, and without such a list it would be almost impossible to

distinguish between or identify some species, even with the aid of the key provided (Chapter 9). The characters listed in the diagnosis are discussed further in the discussion following each description. Furthermore, within the discussion, there is reference to the species or groups of species morphologically most similar to the described species, and the significant differences are highlighted since these are not as easily obtained from the diagnosis or description.

Within each description all intraspecific variation is discussed. Continuous quantitative characters are given as ratios, with the first value being that for the holotype or lectotype, followed in parentheses with range and mean values of the paratypes or paralectotypes and measured material. Where species have been synonymised, values for the holotype or lectotype of the junior synonym are provided in square brackets.

Transcription of information on the labels associated with each specimen has been placed at the end of the species description and serves a dual function: it provides for the identification of specimens on which the description was based and shows the distribution of the species. Since all specimens identified and described in this study have been provided with determination labels, it was not considered necessary to transcribe exactly the information on all labels. Instead, the information is given in a consistent format that allows for the most accurate retrieval of information about geographical and seasonal distribution.

Information of holotype and/or lectotype specimens is recorded either verbatim from the labels or from the original description if the holotype or lectotype was not seen. The end of a line is indicated by a "/", while "//" indicates information on the reverse side of the label. Locality coordinates and other important missing information not provided on the specimen label are given in square brackets. Corrected spelling errors in locality and species names, or changes in the locality names, are also placed in square brackets. Specimen labels printed in any other language than English have been translated with the English translation provided in square brackets. Locality coordinates were obtained from several atlases and checked with the National Imagery and Mapping Agency (1997).

Information for paratypes, measured and additional material is not recorded verbatim from the labels but modified so that all spelling errors (including species names) are corrected. For locality names that have been altered, the newer name is used. Some of the information provided on the labels has been abbreviated. Locality coordinates, not provided on most specimens labels, are given. Where the country is known, but the locality coordinates for the region where the specimen(s) was caught are not known,

details of the specimen label are provided at the beginning of the specimen list for that particular country. If the country is not known (even if a region or towns name is provided but its locality cannot be determined), the label information is placed at the end of the specimen list under the heading, "Locality indeterminate". If the locality is not provided on the label or is vague, possibly covering several countries (e.g. Transcaspia), the label information is placed at the end of specimen list under the heading, "Locality not known" or "Locality indefinite" respectively. Although the accepted practice is to provide provincial names for South African specimens, this was not done since the provinces have been renamed and there is still dispute over certain provincial borders. Specimen labels printed in a language other than English have been translated into English with only the English translation provided.

Associated with each species description is a distribution map. Only those specimens studied and for which the exact locality was known were plotted on the map.

4.6. MATERIAL EXAMINED

The material on which the study was based are housed in the institutions listed below. They have been referred to in the text by the acronyms, which have mostly been taken from Arnett *et al.* (1986).

AMGS - Albany Museum, Grahamstown, South Africa
AMNH - American Museum of Natural History, New York, U.S.A.
CASC - California Academy of Sciences, San Francisco, U.S.A.
DJBC - Collection of Prof. D.J. Brothers, Pietermaritzburg, South Africa
IBPV - Institute of Biology and Pedology, Vladivostok, Russia
ICCM - Carnegie Museum, Philadelphia, U.S.A.
LBWG - Landbouwuniversiteit, Wageningen, Nederland
MCSN- Museo Civico De Storia Naturale, Genoa, Italy
MNCN - Museo Nacional De Ciencias Naturales, Madrid, Spain
MNHN - Muséum National d'Histoire Naturelle, Paris, France
MTMB - Magyar Természettudományi Múzeum, Budapest, Hungary
NCSA - Biosystematics Division, Plant Protection Research Institute, Pretoria, South Africa
NHML - The Natural History Museum, London, England
NMKE - National Museum of Kenya, Nairobi, Kenya
NMNH - National Museum of Natural History, Smithsonian Institution, Washington, U.S.A.
NONV - Collection of Dr G. Nonveiller, Zemun, Yugoslavia
SAMC - South African Museum, Cape Town, South Africa

SMWH - State Museum, Windhoek, Namibia

TAUI - Zoological Museum, Tel Aviv University, Tel Aviv, Israel

TMSA - Transvaal Museum, Pretoria, South Africa

UCDC - R.M. Bohart Museum of Entomology, University of California, Davis, U.S.A.

UCRC - University of California, Riverside, U.S.A.

UPSA - University of Pretoria, Pretoria, South Africa

ZMAS - Zoological Institute, Academy of Sciences, Leningrad, USSR

ZMHB - Museum für Naturkunde der Humboldt-Universität, Berlin, Germany

5. DESCRIPTION OF CHARACTERS

5.1. INTRODUCTION

Species of *Tricholabiodes* show a very limited number of taxonomically useful characters, but at the same time often appear to exhibit a considerable range of variation. Many of the species are localised in a particular geographic region while several are geographically widespread. Because of the considerable variation in some species, many of the more conventional characters used by hymenopterists are not reliable.

Characters can be defined as either qualitative or quantitative. Qualitative characters are those which fall into a number of discrete states having no clear-cut order (Digby & Kempton 1991); for example, the presence or absence of the felt line on S2. Quantitative characters are divided into two categories, discontinuous or continuous. Discontinuous quantitative characters are those which fall into a number of discrete states but have a clear-cut order (Digby & Kempton 1991); for example, the number of rows of spines on the ventral surface of the metabasitarsus. Continuous quantitative characters are those characters which are given an absolute value and cannot be divided into a number of discrete states (Digby & Kempton 1991); for example, head length. Each group of characters is important, provided they show some degree of interspecific variation either in the identification and description of a species or in the phylogenetic analysis of the genus.

A listing and discussion of characters used in the descriptions is provided in the discussion below. The taxonomic usefulness of individual characters and their incorporation in phenetic and phylogenetic studies are discussed in Chapters 6 (Phenetic Analysis) and 7 (Phylogeny of species of *Tricholabiodes*).

5.2. EXPLANATION AND LISTING OF CHARACTERS

Punctation

Punctation, commonly referred to as pits or depressions in the cuticle, is described in terms of density and size. Density refers to the spacing between each puncture, and is described as either sparse (interspaces wider than puncture diameter), moderate (interspaces subequal to puncture diameter) or dense (interspaces narrower than puncture diameter). Size refers to the diameter across each puncture, and is described as either fine, medium or coarse. If the punctures appear superficially netlike or appear to be made up of a network of ridges, they are described as reticulate. Often the punctures, particularly on T2, are separated by strong longitudinal ridges, referred to as costae. [The terminology referring to surface sculpturing is that used by Nichols (1989).]

Colour:

All descriptions include a brief summary of general colouring. In describing colour, instead of using terminology which is often confusing, outdated, and with conflicting definitions depending on the reference consulted, the option of using terms for which the definitions are commonly known was preferred (e.g. "yellowish-brown" instead of "testaceous").

Head:

Head width:length. Head width was measured as the greatest distance across the compound eyes, viewed dorsally. Head length was measured along the midline, from the anterior margin of the frons, between the toruli, to the posterior margin of the vertex, viewed dorsally.

Head width:mesosomal width. Mesosomal width was measured as the greatest distance between the sides, posterior to the tegula, along an imaginary line perpendicular to the midline.

Head width:vertex width. Vertex width was measured as the distance between the compound eyes, on a line touching the anterior margins of the lateral ocelli. This measurement is not the true width of the vertex, but because of the variable shape of the posterior sides of the head, behind the compound eyes, it ensures a standardized measurement.

Head length:compound eye length. Compound eye length was measured as the greatest distance between the anterior and posterior margin, viewed laterally.

Shape of sides behind compound eyes when viewed dorsally: either subparallel (figs 10c-d), slightly (fig. 10b) or strongly (fig. 10a) convergent.

Frons form and structure: punctation; depth of foveola (pit along midline at midheight, between median ocellus and toruli); presence or absence of longitudinal median groove between foveola and median ocellus; depth of longitudinal median groove between toruli; presence (and shape) or absence of scrobal tubercle; structure of antennal tubercle.

Vertex length:width. Vertex length was measured as the distance from the anterior margin of the median ocellus to the posterior margin of the head, viewed dorsally.

Vertex width:frons width. Frons width was measured on an imaginary line perpendicular to midline, at midheight between median ocellus and toruli, viewed dorsally.

Vertex: shape and punctation.

Compound eye: ommatidia distinct or indistinct.

Ocelli: size and shape.

Interocellar distance:ocellocular distance. Interocellar distance was measured as the shortest distance between the mesal margins of the lateral ocelli, viewed dorsally. Ocellocular distance was the average distance between mesal margin of compound eye and outer margin of lateral ocellus,

viewed dorsolaterally.

Gena: punctation.

Clypeus height:width. To measure maximum clypeus height or width, the head was viewed anteriorly. Clypeus height was measured from the dorsal margin of the clypeus, along the midline, to the free ventral border (excluding the lateral teeth). Clypeus width was measured as the greatest width across the clypeus, perpendicular to the midline.

Clypeus structure and form: shape of free border (fig. 12); shape and sculpturing of central portion; arrangement and length of the vestiture.

Mandible structure and form: presence (and structure) or absence of carina along the dorsal rim; relative height (taken as the height of the mandible when viewed laterally) to thickness (taken as the width of the mandible when viewed dorsally); relative length of apical tooth to middle tooth; position of inner tooth, relative to middle tooth (fig. 11); shape of inner tooth (figs 11b-d); presence or absence of a tooth on the mesal margin; size of subtending ventral tooth; presence or absence of a strong vertical carina at midlength on the outer lateral surface; presence or absence of a dense ovate pubescent patch on the superior basal half of the outer lateral surface.

Mandibular height across ventral tooth:mandibular height at base. To measure mandible height, the mandible was viewed laterally. Mandible height across ventral tooth was measured as average height across ventral tooth. Mandible height at base was measured as average height across mandible at base.

Scape length:first flagellomere length. Scape and flagellomere lengths were measured laterally. Average measurements for the scape and first flagellomere were calculated.

Scape carina: number of longitudinal carinae (either one or two) on ventral surface of the scape.

First flagellomere: presence or absence of a thin tufted ring of setae encircling the segment, one-third of the length from the base of the segment.

Second flagellomere length:first flagellomere length. Each flagellomere length was measured laterally. Average measurements for the first and second flagellomere were calculated.

Second flagellomere length:third flagellomere length. Each flagellomere length was measured laterally. Average measurements for the second and third flagellomere were calculated.

Mesosoma:

Mesosoma length:width. Mesosoma length was measured diagonally from anterior margin of pronotum, excluding pronotal collar, to the extremity of the propodeum, viewed laterally.

Pronotum width:mesosoma width. Pronotum width was measured as greatest distance, perpendicular to the midline, across the pronotum, viewed dorsally.

Pronotum structure and form: punctation; shape of anterior margin and humeral angles; size of lateral epaulet.

Mesoscutum length:width. Length of mesoscutum was measured along the midline, from anterior to posterior margin, viewed dorsally. Width of mesoscutum was measured perpendicular to the midline, just anterior to the teguli, viewed dorsally.

Mesoscutum structure and form: punctation; whether posterolateral corner of mesoscutum is raised or flat. What are referred to in the descriptions as notauli have sometimes been referred to as parapsidal furrows (Daly 1964, Matsuda 1970).

Scutellum structure and form: shape; punctation.

Dorsellum structure and form: punctation; presence or absence of lateral ridges.

Propodeum: length of middle areola, relative to neighbouring areae.

Mesepisternum structure and form: punctation; presence or absence of a scrobe (a single concavity found in the superior half of the mesepisternum); presence or absence of mesepisternal groove (vertical groove connecting the scrobe with the mesocoxa).

Mesosternum structure and form: The area immediately posterior to the procoxa is slightly concave and is referred to in the descriptions as the anterior concavity. The sides of the concavity are either smooth or with slight transverse ridges. Other characters used are: punctation; presence or absence of a pair of conical protuberances on the anteromesal surface; whether or not anteromesal surface on either side of midline is swollen with transverse ridges on the mesal surface.

Forewing:

Wing cell measurements are taken from the inner edges of the veins. The measurements from both the wings were averaged.

Pterostigma length:length of anterior margin of marginal cell. Length of pterostigma and anterior margin of marginal cell was measured along the costal vein.

Marginal cell length:width. Length of marginal cell was measured as the greatest distance across the cell, usually almost parallel with the costal vein. Width of marginal cell was measured perpendicular to the length measurement.

Marginal cell length:second submarginal cell length. Length of second submarginal cell was measured as the greatest distance across the cell.

Second submarginal cell: shape of anterior region (fig. 13).

Second submarginal cell length:discoidal cell length. Length of discoidal cell was measured parallel to the costal vein.

Wing veins can be categorised according to their appearance into three groups: tubular, nebulous or spectral. A tubular wing vein is a pigmented vein that is hollow, therefore, appearing darker laterally and paler medially. This vein can be seen with both reflected and transmitted light. A nebulous wing vein is uniformly pigmented, without a tubular structure and can be seen with both reflected and transmitted light. A spectral wing vein is indicated only by a ridge or furrow on the wing surface. It has no trace of pigment and can only be seen with reflected light (Huber & Sharkey 1993). The characters considered here are the structure of medial vein and vein 3r-m. Each is categorised according to their appearance.

Accessory vein: Lanham (1951) referred to this vein, extending apically from the middle of the third submarginal cell, as the accessory vein. Its origin is unknown. This vein is categorised according to its appearance and its length was measured, relative to the length of the marginal cell.

Legs:

The measurements from both the legs were averaged.

Mesocoxa form: presence or absence of a carina, or protuberance on mesal margin or outer lateral surface.

Mesofemur form: shape of femur when viewed laterally (fig. 15); presence or absence of a protuberance posteriorly on basal half; shape of anterior and posterior surfaces, whether convex or concave.

Mesotibia form: shape of distal half of tibia; length of macrosetae; shape of longer tibial spur.

Shorter mesotibial spur length:longer mesotibial spur length. Spur length was measured as the distance between the ends.

Mesobasitarsus form: whether mesobasitarsus is straight or curved, viewed dorsally or laterally.

Metacoxa structure and form: punctation; shape; sculpturing along mesal margin (fig. 16).

Metatrochanter form: slightly swollen ventrally or not when viewed laterally (fig. 14).

Metafemur form: length of macrosetae.

Metatibial form: length and density of macrosetae; shape of longer tibial spur.

Shorter metatibial spur length:longer metatibial spur length. Spur length was measured as the distance between the ends.

Longer metatibial spur length:basitarsus length. Basitarsus length was measured longitudinally along the midline between the two ends, viewed laterally.

Metabasitarsus: presence (and length) or absence of macrosetae; number of rows of spines on ventral surface.

Metasoma:

Metasoma length:width. Metasoma width was measured as the greatest distance across T2, perpendicular to the midline. For length, each tergum was measured individually and dorsally along the midline, from the anterior border where the sculpturing begins to the posterior margin. The value for each tergum length was summed to obtain a value for total metasoma length. If the metasoma was not completely extended, the specimen was placed in the softening chamber and the metasoma was then completely extended.

T1 length:width. Length was measured between the extremities, viewed laterally. T1 width was measured as the greatest distance across the segment, perpendicular to the midline, viewed dorsally.

T1 length:height of first metasomal segment. Height is measured near the apex of the segment where the greatest height occurs, perpendicular to the midline, viewed laterally.

T1 length:T2 length.

T1 structure and form: shape; punctation.

S1 structure and form: punctation; presence or absence of a median carina.

T2 length:width.

T2 width:mesosoma width.

T2 punctation.

Dorsal felt line length:T2 length. Felt line length was measured between the anterior and posterior extremities, viewed laterally.

T2 length anterior to felt line:T2 length posterior to felt line. Tergum length anterior and posterior to the felt line was measured from anterior and posterior margin of T2 to anterior and posterior extremity of the felt line respectively, viewed laterally.

S2 structure and form: punctation; presence or absence of longitudinal median carina; shape of ventral surface, whether convex or concave; position and length of macrosetae; presence or absence of felt line; presence or absence of diagonal transverse tubercles on posterolateral area.

S3-S6 macrosetae: length and orientation.

Pygidium structure and form: shape; shape of posterior margin; punctation, including pygidial plate.

Hypopygium form: shape of posterior margin (fig. 17); presence or absence of a longitudinal mesal groove.

Genitalia (fig 18):

Descriptions of genitalia are not provided. Instead, each species description is accompanied by a detailed drawing of the lateral (l.v.), dorsal (d.v.) and ventral views (v.v.) of the appropriate genitalia.

Important characters are: shape of paramere; position, length and density of setae on paramere; shape and size of parapenial lobe; shape of volsella, presence or absence of a cavity opening ventrally or laterally on volsella; penis valve, particularly the number of apical teeth, presence or absence of lobe on ventral margin and shape of dorsal basal lobe.

6. PHENETIC ANALYSIS

6.1. INTRODUCTION

If view of the trend towards cladistics, few systematists analyse their data phenetically. However, it is only through a phenetic analysis that species can truly be identified. The aim in doing this analysis therefore was to clarify the status of the species and make decisions on species limits, as well as to determine the morphological relationships between the species. In this regard the phenetic analysis was used as a tool, and not a final product.

In order to support the estimate of species limits both principal components and cluster analyses should be done. A principal components analysis (PCA) is a dimension-reducing technique and not a clustering technique. It is not concerned with finding groups in initially unclustered data. It is mainly concerned with analysing continuous quantitative data that is normally distributed and not coded data that are not normally distributed. It does not, like a cluster analysis, assume that clusters are present, but using a PCA, clusters can be discerned if they are present using the available data set. Alternatively, a criticism of the cluster analysis is that it begins analysing the data by assuming that clusters are present.

6.2. EXPLANATION OF PROCEDURES

The selection of specimens for the analyses was based on morphological and locality differences. Where possible, within each putative OTU, specimens from each of the different localities and/or those specimens that were different in one or several characters were included in the analysis. Therefore, the smallest and largest, as well as those that displayed some qualitative morphological difference from other specimens were included. A total of 447 specimens were selected and analysed.

Forty-three measurements, standardized against mesosoma length, were taken from each specimen using an eye-piece micrometer. These measurements were analysed as standardized data and as ratios (Appendix V). The raw measurements were initially standardized, as at the outset of this study, it was not known that the data would also be converted into, and analysed as, ratios. The procedure used and the results obtained from analysing both forms of data were similar. Therefore, for the sake of brevity, only the data analysed in ratio format are discussed in detail.

The coded characters consisted of 124 binary and multistate characters (Appendix VI). Within each multistate character, the states were ordered and scored so that they formed a linear series, with neighbouring states the most similar (and the extremes of the series the most different).

In determining species limits, an effort was made to simultaneously analyse the ratios and coded characters together. To combine the two types of data sets, the 32 ratios had to be coded. Even though there is a substantial body of literature dealing with the coding of ratios (or continuous characters), very little is known about what is the best way to code these characters. Comprehensive lists of the relevant literature are provided by Stevens (1991) and Thiele (1993). An attempt was made to gap code the ratios. Values for each ratio, for all specimens, were plotted on a series of linear graphs and for each the values formed a continuous sequence with no gaps (or disjunction) between any of them. This made it impossible to gap code the data. According to Stevens (1995, pers comm.[2]) the coding of ratios or continuous characters via gap coding may be done in up to eleven different ways. Each method will produce a tree with a different topology. Considering the controversial nature of this subject and the inability to gap code the ratios, they were not converted into coded data but were analysed separately. All analyses were conducted using the NTSYS-pc, version 1.80 (Rohlf 1993) programme.

6.2.1. Cluster analysis

The procedure used in the cluster analysis is outlined by Sneath & Sokal (1973) and Mayr & Ashlock (1991). For the 32 ratios for 447 specimens (that included 52 predefined OTUs with replicates within each), an OTU-versus-character matrix was drawn up allowing comparison of OTUs (Appendix VII). An inter-OTU distance matrix was derived using squared Euclidean distance and a cluster analysis was done using the unweighted pair group method with averages (UPGMA), with all characters equally weighted.

For the 124 coded characters for 447 specimens (that included 52 predefined OTUs with replicates within each), an OTU-versus-character matrix was drawn up to permit comparison of OTU's (Appendix VIII). An inter-OTU similarity matrix was derived using the simple matching coefficient and a cluster analysis was done using an UPGMA, with all characters equally weighted.

Similarly, for 124 coded characters for 52 OTUs, an OTU-versus character matrix was drawn up to permit comparison of OTU's (Appendix IX). The state for each character for each OTU was based on a hypothetical specimen typical of the species. All specimens measured previously within each OTU were used to calculate an average value, which was rounded off to the nearest

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whole number, for each coded character. An inter-OTU similarity matrix was derived using the simple matching coefficient and a cluster analysis was done using an UPGMA, with all characters equally weighted.

6.2.2. Principal component analysis (PCA)

For analysing the 32 ratios, a correlation matrix was preferred over a covariance matrix as it treats all variables equally (Jolliffe 1986), while a covariance matrix gives greater weight to larger and more variable (those variables with a high variance) measurements. The formation of the correlation matrix resulted in the values having a mean of zero and a standardized deviation of one for each variable.

Coded characters, since they are not normally distributed, could not be analysed using an ordination technique. Williamson (1978) and Jolliffe (1986) showed that when attempting a PCA on coded data, it results in a two-dimensional ordination with a typical horseshoe shape, thus giving a distorted result. Cox (1972), Williamson (1978), Krzanowski (1980), Neff & Marcus (1980) and Jolliffe (1986) recommended methods they believe will eliminate any form of distortion to the result when coded data are analysed separately or with continuous quantitative data in an ordination analysis. Unfortunately, the majority of these methods are locked up in statistical formulae or a computer program which few people understand. These techniques were not included in the analysis, as the time required to fully understand and apply them outweighed the usefulness of the result.

6.3. DISCUSSION OF RESULTS

6.3.1. Cluster analysis

A phenogram based on squared Euclidean distance of 32 ratios for 447 units showed the existence of at least three distinct groups (phena) (fig. 1). (Because of the number of units included in the analyses, it is beyond the capabilities of the NTSYS-pc program to reproduce the entire phenogram. Furthermore, since there was no clustering of units from the predefined OTUs in each of the phena there was no need to reproduce the entire phenogram). A similar result was obtained via the scatterplots of the first two principal components (fig. 2). Within the two large phena, A and B, none of the replicates associated with each predefined OTU were grouped together. Instead, within each of these phena, the replicates associated with each predefined OTU were scattered with replicates associated with the other OTUs.

Compared to the distance phenogram, the phenogram based on the simple-matching coefficient of 124 variables for 447 units, showed the existence of distinct groupings. All replicates grouped together in their predefined OTUs, thereby indicating each predefined OTU as a distinct taxon (species). Figure 3 is the complete branching pattern of a phenon of the phenogram, indicating the trends, in regards to the clustering of units into their predefined OTUs, that occurred throughout the phenogram. The entire phenogram is not shown since the number of units used in the analyses is beyond the reproduction capabilities of NTSYS-pc.

With each predefined OTU recognized as a distinct taxon (species), it was essential to derive a phenogram using a hypothetical specimen typical of the taxon, to show the morphological relationships between the OTUs (fig. 4). This information, highlighting inter-species similarity, was particularly useful in the discussion following each species description where the species most similar to the described species were discussed. There was a tendency for the northern OTUs (OTUs north of the equator) to be grouped separately from the southern OTUs (OTUs south of the equator) (fig. 5).

6.3.2. Principal components analysis (PCA)

The values in the correlation matrix of the continuous quantitative data for 32 variables and 447 units were low, indicating that several principal components are required to account for most of the variation (Jolliffe 1986). The results of the PCA showed that the first five components account for only 58.18% of the variation (Table 1). Plots of principal-component scores for the first two principal components (fig. 2) produced the same groupings as in the cluster analysis when analysing the uncoded data (fig. 1). Three major groupings of OTUs (A, B and *T. denticulatus*), as well as the isolated plotting of *T. niloticus* (paratype)[2] and *T. arabicus*[1], can be determined. The separation between groupings A and B is disputable and is not supported by any statistical evidence. Within groupings A and B there is no discernable clustering of units from each predefined OTU. This is a similar result, vague and uninformative, as obtained from the plots of the other principal components.

A detailed analysis, interpretation and discussion of the plots for each of the principal components was not required for this analysis. It was more important to observe the general trends provided by the data.

6.4. DISCUSSION

Applying the different techniques (PCA and a cluster analysis) on the continuous quantitative data allowed for the results to be tested. Both the cluster analysis and the PCA demonstrated that the uncoded data was uninformative in determining species limits, even though the analysis of these data assisted in the recognition of several major groupings of species. These groupings bore little resemblance to the results from the cluster analysis of the coded data. Although a lot of time was spent in obtaining and analysing the continuous quantitative data it was not wasted. The continuous quantitative data were incorporated with the coded data into each species description.

The coded data, via a cluster analysis, allowed for the recognition and clarification of the status of the species and the determination of species limits.

An additional aim of this part of the study, besides determining species limits and the morphological relationships between species, was to develop a workable formula for analysing continuous quantitative and coded characters simultaneously in the same data set. Unfortunately, this was unsuccessful, but since there is ongoing research in this field, the efforts outlined may prove to be useful in the future should a workable model be derived. The above analysis, combining all the data, can then be redone and the species limits retested.

7. PHYLOGENY OF SPECIES OF *TRICHOLABIODES*

7.1. INTRODUCTION

In this study an attempt is made to estimate the evolutionary history of *Tricholabiodes* as there have been no previous attempts to derive a phylogeny of this genus. The phylogeny presented below is the best estimate using all available specimens and suitable characters. It is to be regarded and treated only as a hypothesis, which should be tested and refined, as additional information (species, characters and specimens) becomes available.

7.2. EXPLANATION OF PROCEDURES

The analysis of 93 adult character states (Appendix III) using the data in Appendix IV resulted in 258 trees of length 352, with a consistency index (ci) of 0.33 and retention index (ri) of 0.61. For all 258 trees, a strict consensus tree was derived (fig. 6). The consensus tree represents the information on grouping shared by all the cladograms used to derive it. The consensus tree had a length of 371, ci 0.31 and ri 0.58.

Analysis of the data using successive approximations character weighting resulted in 1776 trees, each with a raw length of 371 (weighted length 692), ci 0.78 and ri 0.86. Successive approximations character weighting groups species by giving greater weight to characters which show less homoplasy. The application of successive approximations character weighting usually simplifies complex data sets, producing fewer trees of minimal length compared with the number of trees of minimal length produced without weighting. Unfortunately, the use of successive approximations character weighting resulted in more equally most parsimonious trees, with a raw length longer than the trees derived using unweighted characters. The final weight assigned to each of the characters is shown in Table 2. For all 1776 trees, a strict consensus tree, with raw length 396, ci 0.29 and ri 0.54, was derived (fig. 7). A direct comparison of the unweighted and weighted consensus trees showed that each tree provided resolution in different groups.

It is accepted that a consensus tree is unlikely to represent the phylogeny of the group studied. Reasons for this include the following. A consensus tree will always require more steps (have a longer length and lower consistency index) and will, therefore, be less parsimonious than any of the trees from which it was formed (Miyamoto 1985). Consensus trees result in unresolved branching points. Unresolved nodes imply many relationships of the taxa, but not all of the relationships may be possible given the original data set and cladograms (Miyamoto 1985). A consensus tree, since less resolved than any of

the cladograms from which it is calculated, has less explanatory power (Farris 1983) than any of the trees from which it was derived. The derivation of a consensus tree does allow for the recognition of clades that were consistent in all cladograms from which the consensus tree was derived. Thus the consensus tree is used only as a guide in recognizing the true tree. The question is then how to choose among the cladograms.

Several authors, including Brooks *et al* (1986) and Carpenter (1988), have proposed methodologies for selecting a tree from several equally most parsimonious cladograms. Each methodology either has a number of shortcomings or is vague in its application. The selection of the most likely cladogram, representing the best estimate of the phylogeny of *Tricholabiodes*, is based on evidential support (parsimony, resolution of the tree, character placement on the tree, comparison of the tree with weighted/unweighted consensus tree(s) and the use of biogeographic information). The following steps were applied for choosing the correct tree:

Step 1: Parsimony

Since the most parsimonious unweighted trees were significantly shorter (19 steps) than the most parsimonious weighted trees it was assumed that one of the 258 unweighted trees represented the most likely phylogeny of *Tricholabiodes*.

Step 2: Tree(s) that were completely resolved, with all nodes having character support were selected. Only 108 trees, with all nodes having character support, were found to be completely resolved (except for the grouping of *T. signatipennis* + *T. andrei* + *T. stigmaticus* for which resolution of the trichotomy had no character support in any of the trees).

Step 3: All characters for all species were plotted on the trees and each character was evaluated independently to see that it made evolutionary sense.

Each homoplasious state was considered individually to determine whether the homoplasy could be more appropriately explained by a parallelism than a reversal, and whether these reversals, if they could not be explained by a parallelism, were unlikely on evolutionary grounds (such as Dollo's Law). Through the different placement of these characters, it might be possible to reduce the number of reversals without increasing the number of steps. Only 44 of the 108 trees had the majority of the placement of characters on the tree making evolutionary sense.

Step 4: Each of the remaining unweighted tree(s) were compared with the strict consensus weighted tree.

The degree of character support for each of the nodes was analysed.

The trees which had the greatest amount of congruence with the strict consensus weighted tree were preferred. This was important as the two consensus trees showed resolution in different lineages (figs 6 & 7). Only eight of the 44 evolutionarily sensible trees showed some form of congruence with the strict consensus weighted cladogram.

Step 5: Distributional information was plotted on the remaining trees. Those trees that made the most biogeographic sense were selected.

Tricholabiodes is restricted to the arid and semi-arid regions of North and southern Africa, and southeastern Asia. With apparently scant collecting having been done in certain of the southern African and southeastern Asian countries, it is not possible to determine the exact distribution of each species within these regions.

Each species placement along a lineage was analysed to see whether it made biogeographic sense when compared with the subsequent species. For example, it is unlikely that once a species occurs only in southeast Asia, with the previous species occurring in both North Africa and southeast Asia or only North Africa, that the subsequent species will again occur on both continents (Africa and Asia) or only in North Africa. It was essential that along the length of a lineage, the distributional information formed a continual progression.

Using the available distributional information for each species, only one of the eight selected equally most parsimonious unweighted trees made biogeographic sense (fig. 8).

The analysis was repeated several times, altering the order of the above steps. Regardless of the order in which the steps were applied, the analysis always resulted in one tree (fig. 8). This tree, with a raw length much shorter than the most parsimonious weighted trees, is hypothesised to represent the most likely phylogeny of *Tricholabiodes*. Reference in the paragraphs below, unless otherwise stated, is made only in respect of this tree (fig. 8).

The final tree, when compared with the other equally most parsimonious trees, had the least number of characters whose placement on the tree could potentially be considered unlikely on evolutionary grounds. This tree had four characters (shape of sides of head behind compound eyes (0), presence and shape of carina on S2 (72), orientation of setae on S4-S6 (75) and presence of longitudinal depression on mesal area of hypopygium (77)) which could possibly be better explained by a parallelism than a reversal, but

by altering their position on the tree would have significantly increased the length of the tree. When these four characters were removed from the analysis, except for the reduction in tree length and a loss of resolution, the branching pattern remained very similar.

The final tree (fig. 8) showed a lot of congruence with the strict consensus weighted tree (fig. 7), and the majority of the nodes had a high degree of character support. The southern African species are separated into two distinct lineages. The first (*T. denticulatus* + *T. nodosus* + *T. disgregus* + *T. inornatus* + *T. pallidior* + *T. lividus* + *T. concavus* + *T. tortilis* + *T. acer* + *T. petiolatus* + *T. imbellis*) is supported by two homoplasious states (20.1 and 88.1). The more recent lineage of southern African species is also associated with character state 20.1. When the two southern African lineages were combined, by physically grouping them together via several different combinations by using a feature in Clados, version 1.2 (Nixon 1992), the tree was always substantially longer. When character 20 was eliminated from the analysis, the southern African species were still divided into two lineages. In the weighted trees, both the southern African lineages are supported by character state 20.1. The initial clade of southern African species can be separated into three distinct lineages, with each lineage strongly supported by either uniquely derived synapomorphies or a large number of autapomorphies. In addition to three homoplasious states (27.1, 30.1 and 31.1), the first lineage (*T. denticulatus* + *T. nodosus*) is supported by the possession of two unique synapomorphies (vertex strongly convex (4.1) and ventral margin of mandible only slightly excised (23.1)). The second lineage (*T. disgregus*) is supported by a large number of autapomorphies (3.1, 9.1, 13.1, 16.1, 22.1, 26.1, 29.1, 35.1, 39.1, 44.1, 59.1, 73.1, 91.2), while the third lineage (*T. inornatus* + *T. pallidior* + *T. testaceus* + *T. lividus* + *T. concavus* + *T. tortilis* + *T. acer* + *T. petiolatus* + *T. imbellis*) is supported, in addition to two homoplasious states (5.1 and 10.1), by an uniquely derived synapomorphy (second submarginal cell anteriorly acute and barely reaching marginal cell (36.1)). It was only in the weighted consensus tree that this clade was almost resolved, whereas in the unweighted consensus tree this clade was totally unresolved. Therefore, since this lineage is similar to the strict consensus weighted tree and the majority of the nodes have strong character support, this is sufficiently sound support for this lineage.

The more recent lineage of southern African species (*T. carinifer* + *T. alveolus* + *T. thisbe* + *T. thisboides* + *T. longicarinatus* + *T. convexus* + *T. paulocellatus* + *T. signatipennis* + *T. andrei* + *T. stigmaticus*), although not characterised by a unique synapomorphy is, as discussed above, associated with two homoplasious states (20.1 and 68.0). This lineage, except for one trichotomy (*T. signatipennis* + *T. andrei* + *T. stigmaticus*), is fully resolved. Divergence of (*T. alveolus* + *T. thisbe* + *T. thisboides*) is supported by one homoplasious synapomorphy (51.2). Although it comprises the same species as the

strict consensus weighted cladogram this lineage is totally unresolved in the weighted cladogram. For all 258 equally most parsimonious unweighted cladograms, the branching pattern in, and the character placement on, this lineage is identical (fig. 6).

The Palaearctic species are separated into seven distinct lineages, with two species (*T. marmaricus* + *T. luridus*) each forming a separate lineage. The lineages of *T. marmaricus* and *T. luridus* are strongly supported by eight (1.1, 12.2, 27.1, 31.1, 48.1, 56.1, 77.1, 82.1) and four (0.2, 48.1, 90.1, 91.1) homoplasious synapomorphies respectively.

The third lineage of Palaearctic species (*T. bactrianus* + *T. recurvatus*) is supported by three homoplastic synapomorphies (46.1, 65.2 and 90.1). This clade is completely supported by both the strict consensus unweighted and weighted cladograms (figs 6 & 7).

The fourth lineage of Palaearctic species (*T. garamantis* + *T. tharensis* + *T. nursei* + *T. beludzhistanus* + *T. asiaticus* + *T. pallidus*) is weakly supported by two homoplasious (reversal) states (68.0 and 81.0). This lineage is partially supported by the strict consensus weighted cladogram (fig. 7), in particular the grouping of (*T. tharensis* + *T. nursei* + *T. beludzhistanus* + *T. asiaticus*) and completely supported, including the branching pattern and character placement, by the strict consensus unweighted cladogram (fig. 6).

The fifth lineage of Palaearctic species (*T. saharicus* + *T. pallidicornis* + *T. niloticus* + *T. arabicus* + *T. indistinctus* + *T. scorteccii*) is weakly supported by two homoplasious synapomorphies (83.0 and 84.1). This clade, except for the absence of *T. ferrugineus*, is partially supported by the strict consensus unweighted (fig. 6) and weighted (fig. 7) cladograms.

The sixth lineage of Palaearctic species (*T. parallelus* + *T. pedunculatoides* + *T. protuberans* + *T. sinuatus* + *T. sudanensis* + *T. pedunculatus* + *T. palaestinensis* + *T. chloroticus* + *T. femoralis* + *T. trochantalis*) is strongly supported by two homoplasious (reversal) states (0.0 and 21.0) and one uniquely derived synapomorphy (formation of a basal protuberance posteriorly on the mesofemur (42.1)). Each node is supported by a combination of several character states. Except for the divergence of (*T. pedunculatus* + *T. palaestinensis*), this lineage is in agreement with the strict consensus weighted cladogram (fig. 7). This separate divergence of (*T. pedunculatus* + *T. palaestinensis*) midway down the length of the clade makes more biogeographic sense than its placement at the apex of the clade, as in the strict consensus weighted tree (fig. 7).

In addition to two homoplasious states (83.0 and 90.1), the most recent lineage of Palaearctic species (*T. nonveilleri* + *T. brothersi* + *T. mandibularis* + *T. ferrugineus*) is supported by the possession of one unique synapomorphy (S2 mesally concave (69.1)). Each divergence of species within this clade is supported by a combination of several character states. This clade, except for the inclusion of *T. ferrugineus*, is in complete agreement with the weighted cladogram (fig. 7) and is completely supported, including the branching patterns and character support at each node, by the strict consensus unweighted tree.

There are seven separate lineages of North African and southeastern Asian species, of which four have the basal species distributed in North Africa and the apical species distributed in southeastern Asia (fig. 9). The lineages of *T. luridus* and (*T. bactrianus* + *T. recurvatus*) only have an Asian distribution, while the lineage of *T. marmaricus* is only distributed in North Africa. Along the length of each of these four lineages, except (*T. parallelus* + *T. pedunculatoides* + *T. protuberans* + *T. sinuatus* + *T. sudanensis* + *T. pedunculatus* + *T. palaestinensis* + *T. chloroticus* + *T. femoralis* + *T. trochantalis*), there is a continual progression with the basal species occurring in Africa and the apical species distributed only in southeast Asia. In the lineage of *T. parallelus* through to *T. trochantalis*, *T. protuberans* is distributed in Oman and *T. sinuatus*, the following species along the length of the lineage, is distributed only in Somalia (fig. 9). *Tricholabiodes protuberans* and *T. sinuatus* phylogenetic position relatively to each other is probable, considering that Somalia and Oman are geographically quite close to each other. In no other lineage is there an occurrence where once a species is distributed in both North Africa and Asia, the following species along the length of the lineage has a distribution only in Africa. Nor are there examples where once a species is solely distributed in Asia, the following species along the lineage are partially or entirely distributed in Africa.

None of the southern African species are placed in the same clade as the North African species, nor does the second divergence of southern African species (*carinifer* + *alveolus* + *thisbe* + *thisboides* + *longicarinatus* + *convexus* + *paulocellatus* + *signatipennis* + *andrei* + *stigmaticus*) arise from an Asian ancestor (fig. 9).

7.3. BIOGEOGRAPHY

The ancestral form of *Tricholabiodes* is assumed to have arisen in central Africa, separate from the nocturnal Mutillidae of the rest of the world. The relatively plesiomorphic species, occurring at the base of the cladogram (fig. 9), have a disjunct distribution relative to each other: *T. marmaricus* is recorded from Tunisia and Libya, while (*T. denticulatus* + *T. nodosus*) occurs only in southern Africa. It is not

possible to determine whether these species previously had a broader distribution than at present, or whether there is an extinct species, yet to be discovered, with a central African distribution and which may have branched off from the base of the cladogram. Neither hypothesis, although logical, is strongly supported by the available evidence (fig. 9). It is assumed that *Tricholabiodes* arose in central Africa since that is the intermediate point between the two groups of relatively plesiomorphic species. If this is true, the dispersal and diversification of *Tricholabiodes* occurred from central Africa, south into southern Africa and north into North Africa, then west across central North Africa and east into southeastern Asia. There have been two separate radiations southwards into southern Africa. This southern diversification of *Tricholabiodes* is in partial agreement with Brothers (1975), who stated that the diversification and dispersal of the Dasylabrini apparently occurred towards the south and west across Africa.

Presently, *Photopsis* Blake, which is restricted to the desert environment of North America, is the only other genus of nocturnal mutillids whose biology has been well studied (Ferguson 1962). Considering the evolutionary history of *Photopsis* and the climatic changes on the African continent during and after the break-up of Gondwanaland might possibly help to decipher the factors which may have influenced the speciation of *Tricholabiodes*. *Photopsis* is restricted to areas which are now occupied by plants derived from elements of the Madro-Tertiary geoflora (Ferguson 1962). With an increase in the arid environment during the Pleistocene, the Madro-Tertiary elements responded by evolving rapidly to occupy the arid area. Apparently with equal rapidity, insects evolved adaptations to the high temperatures, the aridity, the new plants, and to each other (Ferguson 1962). A multitude of species arose, particularly among the Hymenoptera. Due to this increase in Hymenoptera diversity, the immature stages became available as hosts to *Photopsis*. *Photopsis*, in response to the harsh arid environment, evolved their nocturnal habit, and were thus able to avoid the intense radiation of the sun in the desert (Ferguson 1962). It can be hypothesised, although there is no supporting evidence and we do not know what their hosts are, that *Tricholabiodes* adapted a similar life-style as *Photopsis* in response to the arid conditions.

As discussed, *Tricholabiodes* is confined to the Afrotropical and southern Palaearctic regions and has not yet been recorded from the Oriental and Australian Regions nor from the New World. Climatic factors are hypothesized to be partially responsible for the present distribution of *Tricholabiodes*. According to collected material, *Tricholabiodes* is restricted to areas with dry hot summers, mild to warm winters and with less than 500 millimetres mean annual rainfall (Bayliss & Brothers 1996) which falls unpredictably and varies in quantity from year to year (Lovegrove 1993). These climatic features

are typical of the arid and semi-arid regions of Africa and southwestern Asia. Central Asia, including the Gobi Desert, although characterised by hot dry summers with infrequent rain (< 500 millimetres mean annual rainfall), have extremely cold winters compared with the mild to warm winters of the Sahara and Namib Desert (Brown 1968). Australia (Australian Desert), southern North America (Great Western Desert) and eastern South America (Atacama Desert) have arid regions with a climate (mean annual rainfall and seasonal temperatures) similar to the Sahara and Namib Deserts (Brown 1968), and thus probably would be able to support species of *Tricholabiodes*.

A possible hypotheses for the genus' absence from the New World and the Australian Region is that *Tricholabiodes* arose only after the break-up of Gondwanaland. The present inability of *Tricholabiodes* to migrate across to Australia is probably due to poor dispersal ability and climate. The females are apterous, and unlike some genera of Mutillidae where the nuptial flight is also a means of female dispersal (Brothers 1989), nuptial flights have never been recorded for *Tricholabiodes* (Bayliss & Brothers 1996). This suggests that the dispersal of the females is limited by the distance they can crawl. Recent analyses and advances in Asian palaeolithic archaeology and mammalian palaeontology, in combination with geological evidence, suggest that southeast Asia did not undergo severe climatic fluctuations during the Pleistocene (01.65-0.001 million years [myr]) (Pope 1995) and that the climate was similar to that of the present. The presence of tropical forest-dwelling taxa such as orangutans, gibbons, macaques, and many other forest forms in Far Eastern fossil faunas support this hypothesis. Pollen analysis and modern phytogeographic evidence of the past and present existence of high multi-canopied flora further support this hypothesis (Pope 1995). Because of this tropical climate in eastern and southeastern Asia, characterised by high humidities accompanied with seasonal or continuous rainfall, *Tricholabiodes* has been, and is presently, restricted from migrating eastwards across Asia into Australia.

8. GENUS *TRICHOLABIODES*

The descriptions of *Tricholabiodes* by Radoszkowski (1885), André (1901, 1903 & 1910), Bischoff (1920) and Lelej (1985) are inadequate since they have insufficient detail and many important diagnostic characters are not mentioned. The genus is here redescribed, accounting for all variation that occurs within and between the species. Although no formal description was provided by Brothers (1975), in his revision of the Aculeata, he made particular mention of some of the more diagnostic features of this genus and discussed certain of these characters at length.

***Tricholabiodes* Radoszkowski, 1885**

(τριχολάβιον) volsella, (ώοτιδης) oval

Tricholabiodes Radoszkowski, 1885: 35. ♂

[*Mutilla*] (*Tricholabiodes*) Rad.[oszkowski]; André, 1896a: 267. ♂

M.[*utilla*] (*Tricholabiodes*) Rado[s]z.[kowski]; Magretti, 1898: 42. ♂

Tricholabiodes Radoszkowski; André, 1902: 20. ♀ & ♂

[*Mutilla*] (*Tricholabiodes*) Rad.[oszkowski]; André, 1903: 167. ♀ & ♂

Tricholabiodes Radoszkowsky [*sic*]; André, 1910: 31. ♀ & ♂

Tricholabioides [*sic*] Rados[z]k.[owski]; Zavattari, 1910: 3. ♂

Tricholabioides [*sic*] [Radoszkowski]; Bischoff, 1920: 99. ♀ & ♂

Tricholabiodes Radoszkowski; Brothers, 1975: 519, 590. ♂

Tricholabiodes Radoszkowski; Lelej, 1985: 149. ♀ & ♂

Tricholabiodes Radoszkowski; Bayliss & Brothers, 1996: 249. ♀ & ♂

Type species: *T. pedunculatus* (Klug, 1829); designated by Bischoff (1920)

DIAGNOSIS

MALE: Mesosoma golden yellow to medium reddish-brown. Head wider than long. Frons with foveola present. Ocelli usually wider than ocellocular distance. Mandible broader apically than basally; apex tridentate. Mesosoma elongate. Mesoscutum with deeply grooved notauli, no other furrows present. Tegula small. Mesepisternum strongly sculptured, often with scrobe on posterodorsal half. Forewing with pterostigma small, weakly sclerotised; 3rd submarginal cell absent. Metasoma with 1st segment elongate, petiolate. T2 with felt line prominent; S2 with felt line sometimes present at midlength. Pygidium with margin defined by slightly elevated ridge. Genitalia bilaterally symmetrical; paramere

usually narrow, tapering towards apex; volsella oval or elongate, bilobed, digitus well developed; penis valve with apex toothed ventrally.

REDESCRIPTION

MALE: Head golden yellow to black, interocellar area sometimes darker than ocellocular area; clypeus and antenna same colour as or paler than head; mandible with apex black; mesosoma golden yellow to medium reddish-brown; legs with coloration similar to or darker than mesosoma; forewing with distal area, posterior to pterostigma, infuscated; T1 entirely uniform in colour, same colour as mesosoma, or with proximal area same colour as mesosoma and distal area darker than proximal area; T2-T6 usually uniform in coloration, varying from golden yellow to black.

Head wider than long, entirely punctate. Frons with foveola present; antennal tubercle slightly transverse. Malar space smaller than height of mandible at base. Compound eye large, round, entirely strongly convex, weakly faceted, smooth. Ocelli usually wider than ocellocular distance, strongly convex. Clypeus broad, tapering towards the lateral extremities. Mandible broader apically than basally, dorsal rim with carina along proximal half; apex tridentate, apical tooth longer than other teeth; ventral margin excised, with subtending tooth. Antenna filiform, > 0.60 X length of body; scape longer than first flagellomere, anterior surface with one or two longitudinal carina; second flagellomere longer than first.

Mesosoma elongate. Pronotum weakly to strongly sculptured, dorsal and lateral humeral epaulette present. Mesoscutum with clear, continuous, deeply grooved notauli, no other furrows present; weakly sculptured, posterolateral corner strongly sculptured. Tegula small, oval, glossy and sparsely punctured. Scutellum 0.50 X width of mesoscutum, moderately to strongly sculptured. Dorsellum 0.50 X width of scutellum, slightly raised, moderately to strongly sculptured. Propodeum widest anteriorly, entirely areolate-reticulate. Mesepisternum strongly sculptured, often with scrobe posterodorsally. Metepisternum nitid and superficially impunctate on dorsal two-thirds, ventral one-fourth to one-third with coarse, shallow, circular areolate-reticulate sculpture, continuous with but finer than that on propodeum. Mesosternum with weak irregular transverse ridge anterior to mesocoxa.

Forewing. Pterostigma small, weakly sclerotised; first and second submarginal cell entirely closed; third submarginal cell absent.

Legs. Simple, densely covered with microsetae; macrosetae sparse, usually shorter than shorter metatibial spur; meso- and metacoxa often with a carina or a protuberance on mesal margin; mesofemur

sometimes with a small protuberance on posterior basal half; ventral surface of metatibia and metabasitarsus with one to three rows of short spines.

Metasoma elongate. First segment elongate, petiolate, swollen posteriorly, T1 weakly to strongly sculptured. T2 weakly to strongly sculptured; felt line prominent, centrally situated along lateral margin; S2 moderately to strongly sculptured anteriorly; felt line sometimes present laterally at midlength. T2-T6 with setae on posterior margin sparse to moderate; S3-S6 often with setae strongly grouped on posterior margin. Pygidium with margin defined by slightly elevated ridge; hypopygium with weak sculpturing. Genitalia bilaterally symmetrical; paramere usually narrow, tapering towards apex, mesal margin setose; volsella oval or elongate, bilobed, ventral surface covered with setae, digitus well developed; penis valve with apex toothed ventrally, setae only on apical and outer lateral surface.

FEMALE: Descriptions in André (1902, 1903, 1910), Bischoff (1920) and Lelej (1985). André (1903) and Bischoff's (1920) descriptions are the most accurate and thorough. The females are currently being revised by Bayliss & Brothers and taxonomic details will be published later.

DISTRIBUTION

Tricholabiodes is restricted to the Afrotropical and the Palaearctic Regions. This genus is extremely wide ranging, occurring from Egypt and Algeria in the north to the Cape Peninsula in the south (one specimen recorded from Table Mountain), and from Senegal in the west to India in the east. This genus is confined to the arid and semi-arid regions.

HOST RECORDS

There is only one host record (Gess & Gess 1997); it is a single undescribed female reared from the cell of a *Quartinia* sp. (Vespidae: Masarinae). This particular host cell was recovered from a sand-filled shell of *Trigonephrus* (Mollusca: Acavidae). These shells are a common sight in the sandy sparsely vegetated areas of northwestern Namaqualand and southwestern Namibia.

9. SPECIES OF *TRICHOLABIODES*

9.1. INTRODUCTION

Why should taxonomists describe species or redescribe a previously described taxon? The most obvious reason is that descriptions form the foundation of taxonomy. Furthermore, since many of the descriptions published prior to the beginning of this century are totally inadequate, the species upon which these descriptions were based have to be redescribed. The value of a description is in direct proportion to the judgement of the author and his/her ability to select and describe significant characters.

The description must serve to distinguish one species from other similar or closely related species which are already known. It should give information not only on characters that are diagnostic with relation to previously described species, but also on characters that may distinguish the species from yet unknown species. In describing species, the taxonomist should achieve two objectives: diagnosis and delimitation (Mayr 1969). Diagnosis means distinguishing between things, while delimitation means setting limits to things (Mayr 1969).

With the availability of new techniques, it is important that old species descriptions are revised, particularly where errors have been noticed. The redescription of hitherto poorly described forms is an extremely important element of revisional and other taxonomic work. In the present state of our knowledge of many animal groups, redescriptions are often of greater importance than the description of new species.

It is in the light of the above that previous described species of *Tricholabiodes* are redescribed and new species described.

9.2. KEY TO SPECIES (males)

The following: *T. nuristanus* Lelej, *T. denticrus* Bischoff, *T. niloticus persicus* Suárez, *T. somalicus* Suárez and *T. israeliticus* Suárez, are not included in the key. As previously indicated, type material of each of these taxa could not be obtained or located and, therefore, the material was not studied. Furthermore, the taxa could not be identified using all available literature (Lelej & Kabakov 1980, 1981; Suárez 1990). The descriptions of these taxa are vague and generally superficial and do not provide a sufficient array of characters which could be incorporated in the key below for identifying them unambiguously.

1. Free border of clypeus with mesal area arched and mesally notched forming a triangular protuberance on each side of midline (fig. 12f), or entirely convex with a rounded, longitudinally elongate or triangular protuberance on either side of midline (fig. 12g-h) 2

   Free border of clypeus truncate (fig. 12a), slightly protruding in a complete arch (fig. 12b-d), entirely convex (fig. 12e) or flat; never notched or with a protuberance on either side of midline 34

2. Mesal margin of metacoxa carinate (fig. 16g-h), ridged (fig. 16f) or protruding (fig. 16b-e). The protrusions can be angulated, dentiform or forming a slightly rounded lobule (fig. 16i) .. 3

   Mesal margin of metacoxa simple (fig. 16a), although edges of punctures along mesal margin may give the impression of a longitudinal carina 28

3. Mesal margin of metacoxa not ventrally enlarged, in cross-section subsquare or rounded 4

   Posterior half of mesal margin of metacoxa slightly ventrally enlarged and strongly carinate, in cross-section subtriangulate; (genitalia as in fig. 19); Namibia, South Africa .... *convexus* sp. nov.

4. Mesal margin of metacoxa with a longitudinal carina, sclerotised ridge, subtrianguloid protuberance or a rounded lobule; metatibia with all macrosetae shorter than its shorter metatibial spur 5

   Mesal margin of metacoxa with a rounded protuberance > 0.5 X length of coxa (fig. 16i), apical margin of protuberance slightly sclerotised and upturned; metatibia with macrosetae on anterior and posterior surface in subequal numbers and increasing in length distally, proximal setae longer than shorter spur but shorter than longer spur, distal setae longer than longer spur; (genitalia as in fig. 20); South Yemen ..... *chloroticus* (Gribodo).

5. Posterior margin of hypopygium deeply notched mesally (fig. 17c) 6

   Posterior margin of hypopygium convex (fig. 17b) or shallowly notched mesally 10

6. Mesofemur, in lateral view, robust with greatest width at basal third, dorsal and ventral surface subparallel (fig. 15b), basal half with a slight elongate protuberance posteriorly 7

   Mesofemur, in lateral view, slender with greatest width at midlength (fig. 15a), basal half without a protuberance posteriorly 9

7. Anterior mesal area of S2 simple or with a longitudinal carina > 0.4 X length of sternum; S3-S6 with subequal numbers of decumbent and erect setae; mesal area of hypopygium with a longitudinal depression 8

   Anterior mesal area of S2 with a slight longitudinal carina < 0.3 X length of sternum; S3-S6 with all setae decumbent; mesal area of hypopygium without a longitudinal depression;

(genitalia as in fig. 21); United Arab Emirates, Oman . . . . . *femoralis* sp. nov.

8. Head with sides behind compound eyes subparallel, distinct from weakly convex posterior margin (fig. 10d); mesofemur with posterior face moderately to strongly concave, often with a slight carina dorsally; S2 with long erect setae, longer than shorter mesotibial spur, anterior mesal area with a slight carina < 0.5 X length of sternum, posterior margin with setae increasing in density towards the midline; (genitalia as in fig. 22); Libya, Egypt, Mali, Niger, Chad, Nigeria, Cameroon, Sudan, Djibouti, Ethiopia, Saudi Arabia, Oman . . *sudanensis* Suárez.

Head with sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin (fig. 10b); mesofemur convex or only slightly concave posteriorly; S2 with setae shorter than shorter mesotibial spur, anterior mesal area without a carina, posterior margin with setae evenly distributed; (genitalia as in fig. 23); United Arab Emirates, Oman . . . . . *trochantalis* sp. nov.

9. Head with sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin (fig. 10b); mesal margin of metacoxa with a short triangular protuberance 0.30-0.40 X length of coxa, apex of protuberance slightly hook-like; anterior two-thirds of T2 with longitudinal reticulations (reticulations longer than wide); S3-S6 with setae decumbent; (genitalia as in fig. 24); Egypt, Saudi Arabia, Oman . . . . .

laterally on superior basal half with a dense ovate pubescent patch, at midlength with a strong vertical carina; mesal margin of metacoxa with a short triangular protuberance 0.25 X length of coxa, ventral outer lateral surface with a slight carina (fig. 16f); (genitalia as in fig. 27); Iraq, Oman, United Arab Emirates ..... *brothersi* sp. nov.

12. Ventral mandibular margin strongly excised, subtending tooth well-developed; pronotum with anterior portion of lateral surface with pit-like, shallow reticulations 13

Ventral mandibular margin weakly excised, subtending tooth minute; pronotum with anterior portion of lateral surface with moderate, medium to coarse punctation; (genitalia as in fig. 28); Namibia, South Africa ..... *nodosus* Bischoff.

13. Anterior mesal area of S2 without a longitudinal carina 14

Anterior mesal area of S2 with a longitudinal carina 17

14. Head with sides behind compound eyes convergent posteriorly and gradually merging with weakly convex posterior margin (figs. 10a-b); S2 with setae evenly arranged and shorter than shorter mesotibial spur, with felt line 15

Head with sides behind compound eyes subparallel, distinct from weakly convex posterior margin (fig. 10c); S2 with setae denser medially than laterally, setae longer than shorter mesotibial spur, without felt line; (genitalia as in fig. 29); India ..... *nursei* Lelej.

15. Mesosoma approximately as wide as or only slightly wider than head; mesoscutum with posterolateral corner raised; mesobasitarsus, in lateral view, straight 16

Mesosoma broad, one-fifth wider than head; mesoscutum with posterolateral corner flat; mesobasitarsus, in lateral view, curved ventrally; (genitalia as in fig. 30); Tunisia, Libya ..... *marmaricus* Invrea.

16. Middle and inner mandibular teeth separated by a distance half width of apical tooth (fig. 11a), inner tooth truncate (fig. 11d); dorsellum laterally simple; mesal margin of metacoxa with an arched protruding ridge < 0.5 X length of coxa (fig. 16f); mesal area of hypopygium simple; (genitalia as in fig. 31); Pakistan ..... *recurvatus* sp. nov.

Middle and inner mandibular teeth separated by a distance subequal to width of apical tooth (fig. 11c), inner tooth acute (fig. 11c); dorsellum laterally ridged; mesal margin of metacoxa with a longitudinal carina > 0.6 X length of coxa (fig. 16h); mesal area of hypopygium with a longitudinal depression < 0.5 X length of sternum; (genitalia as in fig. 32); India ..... *tharensis* Lelej.

17. Middle and inner mandibular teeth adjacent (fig. 11b) 18

Middle and inner mandibular teeth separated by a distance subequal to width of apical tooth (fig. 11c) 22

18. Anterior mesal area of S2 with a slight carina, < 0.5 X length of sternum 19

Anterior mesal area of S2 with a robust carina, > 0.5 X length of sternum; (genitalia as in fig. 33); Namibia, South Africa . . . . . *longicarinatus* sp. nov.

19. T2 darker than mesosoma; free border of clypeus strongly arched, notched forming a triangulate protuberance on each side of midline (fig. 12f); first flagellomere simple; anterior one-third of T2 with longitudinal reticulations or costulate; anterior mesal area of S2 with a carina slight and entirely uniform; S3-S6 with setae decumbent, pointing posteriorly 20

T2 same colour as mesosoma except for a narrow dark band at apex; free border of clypeus convex with a rounded tubercle on each side of midline (fig. 12h); first flagellomere basally with a ring of setae; anterior one-third of T2 punctate; anterior mesal area of S2 with the carina anteriorly bulbous, posteriorly slight; S3-S6 with subequal numbers of decumbent and erect setae; (genitalia as in fig. 34); Angola, Namibia, South Africa . . . . . *carinifer* Bischoff.

20. Head darker than mesosoma, sides behind compound eyes subparallel, distinct from weakly convex posterior margin (fig. 10d) 21

Head, excluding interocellar area, same colour as mesosoma, sides behind compound eyes convergent posteriorly and gradually merging with weakly convex posterior margin (fig. 10b); (genitalia as in fig. 37); South Africa, Namibia . . . . . *stigmaticus* Bischoff.

21. Vertex, posterior to lateral ocellus, with moderate fine punctation, interspaces subequal to puncture diameter; meso- and metacoxae same colour as mesosoma; anterior one-third of T2 with longitudinal reticulations, sparsely and finely punctate within each reticulation; (genitalia as in fig. 35); South Africa . . . . . *signatipennis* (André).

Vertex, posterior to lateral ocellus, with dense, fine to medium punctation, interspaces narrower than puncture diameter; meso- and metacoxae darker than mesosoma; anterior two-thirds of T2 costulate, sparsely and finely punctate between costae; (genitalia as in fig. 36); South Africa . . . . . *andrei* Bischoff.

22. S2 with felt line 23

S2 without felt line 25

23. Free border of clypeus with mesal area protruding in a weak arch, arch mesally notched forming a weak denticle on each side of midline; mesal margin of metacoxa with a longitudinal carina (fig. 16h) or with a short, protruding, sclerotised ridge (fig. 16f); anterior one-third of T2 with dense coarse punctation; mesal area of hypopygium simple 24

Free border of clypeus convex with a weak protuberance on either side of midline (fig. 12g); mesal margin of metacoxa with a slight protuberance ending apically as a weak sclerotised denticle; anterior one-third of T2 with moderate medium punctation; mesal area of hypopygium

with a longitudinal depression < 0.5 X length of sternum; (genitalia as in fig. 38); Iran, Pakistan . . . . . *pallidus* Lelej.

24. Mandible with inner tooth subrounded (fig. 11b); mesal margin of metacoxa with a longitudinal carina > 0.4 X length of coxa (fig. 16h); metafemur with macrosetae longest at midlength, slightly shorter than or same length as shorter tibial spur; S3-S6 with a subequal number of decumbent and erect setae; (genitalia as in fig. 39); Saudi Arabia . . . . *ferrugineus* sp. nov.
Mandible with inner tooth acute (fig. 11c); mesal margin of metacoxa with a short, arched, protruding, sclerotised ridge < 0.25 X length of coxa (fig. 16f); metafemur with macrosetae subequal in length, shorter than shorter tibial spur; S3-S6 with setae decumbent, posteriorly directed; (genitalia as in fig. 40); Turkmenistan, Tajikistan, Uzbekistan, Pakistan, Iran . . . . . *asiaticus* Radoszkowski.

25. Mesobasitarsus, longer metatibial spur and metabasitarsus straight; S2 with setae shorter than shorter mesotibial spur; posterior margin of hypopygium convex (fig. 17a) 26
Mesobasitarsus, in lateral view, curved ventrally; longer metatibial spur subsigmoidal; metabasitarsus, in dorsal view, curved anteriorly; S2 with long erect setae longer than shorter mesotibial spur; posterior margin of hypopygium shallowly notched; (genitalia as in fig. 41); Somalia . . . . . *sinuatus* sp. nov.

26. Mandible with inner tooth truncate (fig. 11d); mesobasitarsus with anterior and posterior surfaces convex; mesal margin of metacoxa with a triangular protuberance at midlength (fig. 16c); anterior mesal area of S2 convex 27
Mandible with inner tooth subrounded (fig. 11b); mesobasitarsus with anterior and posterior surfaces concave; posterior mesal margin of metacoxa with a large dentiform flange (fig. 16e); anterior mesal area of S2 with a longitudinal concavity (genitalia as in fig. 42); Senegal, Cameroon . . . . . *nonveilleri* Suárez.

27. Mesofemur shallowly concave posteriorly at midlength; mesal margin of metacoxa with a blunt triangular protuberance 0.25-0.50 X length of coxa; metatrochanter slightly swollen ventrally (fig. 14b); anterior one-fifth of T2 with shallow longitudinal rectangular reticulations or entirely costulate, sparsely and finely punctate within each reticulation or between costae; (genitalia as in fig. 43); Ethiopia, Uganda, Kenya, Somalia . . . . . *pedunculatoides* Bischoff.
Mesofemur convex posteriorly at midlength; mesal margin of metacoxa with a short, weakly sclerotised triangular protuberance 0.25 X length of coxa; metatrochanter not swollen ventrally (fig. 14a); anterior one-fifth of T2 punctate, interspaces subequal to puncture diameter; (genitalia as in fig. 44); Kenya . . . . . *parallelus* sp. nov.

28. Anterior mesal area of S2 simple 29

Anterior mesal area of S2 with a longitudinal carina 31

29. Free border of clypeus strongly convex with a rounded tubercle on each side of midline (fig. 12h); middle and inner mandibular teeth adjacent (fig. 11b) or separated by a distance < 0.5 X width of apical tooth (fig. 11a) 30

Free border of clypeus with mesal area protruding in a weak arch, mesally notched forming a weak denticle on each side of midline; middle and inner mandibular teeth separated by a distance subequal to width of apical tooth (fig. 11c); (genitalia as in fig. 45); Iran . . . . . *beludzhistanus* Lelej.

30. Head with sides behind compound eyes distinctly convergent posteriorly and gradually merging with weakly convex posterior margin (fig. 10a); mesepisternal groove absent; anterior one-third of T2 with moderate medium punctation; pygidial plate entirely smooth, except lateral and posterior margins finely punctured; (genitalia as in fig. 46); Algeria, Niger . . . . . *garamantis* Suárez.

Head with sides behind compound eyes only slightly convergent posteriorly and gradually merging with weakly convex posterior margin (fig. 10b); mesepisternal groove present; anterior one-third of T2 with sparse fine punctation; pygidial plate entirely with moderate fine punctation; (genitalia as in fig. 47); Turkmenistan, Iran . . . . . *bactrianus* Suárez.

31. Ocelli large, ocellocular distance < 1.25 X width of lateral ocellus 32

Ocelli small, ocellocular distance > 1.25 X width of lateral ocellus; (genitalia as in fig. 48); South Africa . . . . . *paulocellatus* sp. nov.

32. T2 entirely pale to medium yellowish-brown with darkened narrow band at apex; anterior one-third of T2 with moderate, medium to coarse punctation 33

T2-T3 entirely dark reddish-black; anterior one-third of T2 with longitudinal rectangular reticulations, sparsely and finely punctate within each reticulation; (genitalia as in fig. 49); South Africa . . . . . *alveolus* sp. nov.

33. T1 and T2 entirely pale to medium yellowish-brown with a narrow dark reddish-black band at apex of each tergum, anterior half of T3 dark reddish-black to black, rest of metasoma dark yellowish-brown to pale reddish-black; metabasitarsus with two, often indistinct, rows of short spines on dorsal area; (genitalia as in fig. 50); Namibia, South Africa . *thisbe* (Péringuey)

Metasoma entirely pale to medium yellowish-brown except for a narrow dark yellowish-brown to pale reddish-brown band at apex of T1 and sometimes apex of T2; metabasitarsus with three, often indistinct, rows of short spines on dorsal; (genitalia as in fig. 51); Angola, Namibia, South Africa . . . . . *thisboides* sp. nov.

34. Free border of clypeus convex (fig. 12e) or with mesal area protruding (figs 12b-d) but not truncate, central portion convex; mandible compressed, mesal margin smooth; anterior surface of scape with one longitudinal carina; anteromesal surface of mesosternum, either with no mesosternal processes or with two conical protuberances on each side of midline; posterior mesal margin of metacoxa without a tuft of setae 35

Free border of clypeus strongly protruding, broadly transverse and truncate (fig. 12a), central portion depressed; mandible broadly dilated, mesal margin with a tooth; anterior surface of scape with two longitudinal parallel carinae; anteromesal surface of mesosternum, swollen with transverse ridges, on each side of midline; posterior mesal margin of metacoxa with a tuft of setae; (genitalia as in fig. 52); Namibia . . . . . *disgregus* sp. nov.

35. Dorsal rim of mandible sometimes carinate but never with an enlarged vertical flange; free border of clypeus convex, never with vestiture clumped; mesotibia oval in cross-section 36

Dorsal rim of mandible with an enlarged vertical subtriangular flange ending at junction between middle and inner tooth; free border of clypeus straight to slightly concave, vestiture densely clumped on central raised portion; mesotibia with anterior and posterior surface flattened, ventral margin with a weak carina, subtriangular in cross-section; (genitalia as in fig. 53); Iran . . . . . *mandibularis* Lelej.

36. Anteromesal surface of mesosternum with two conical protuberances on each side of midline 37

Anteromesal surface of mesosternum simple on each side of midline 46

37. Ocelli large, ocellocular distance less than the width of lateral ocellus; mandible with ventral margin strongly excised, subtending tooth well developed; anterior portion of lateral surface of pronotum reticulate; mesoscutum with posterolateral corner raised as an angulate tooth 38

Ocelli small, ocellocular distance at least 2 X the width of lateral ocellus; mandible with ventral margin slightly excised, subtending tooth minute; anterior portion of lateral surface of pronotum with moderate medium punctation, becoming densely and coarsely punctate posteriorly; mesoscutum with posterolateral corner flat; (genitalia as in fig. 54); South Africa . . . . . *denticulatus* sp. nov.

38. Anterior mesal area of S2 with a slight longitudinal carina < 0.5 X length of sternum . . 39

Anterior mesal area of S2 simple 40

39. Frons without a scrobal carina; mesal margin of metacoxa with a longitudinal carina > 0.6 X length of coxa (fig. 16h); S3-S6 with several erect setae; (genitalia as in fig. 68); Namibia

. . . . . *acer* sp. nov.

Frons with a scrobal carina; mesal margin of metacoxa simple (fig. 16a); S3-S6 with decumbent setae; (genitalia as in fig. 55); Namibia, Botswana, South Africa . . . . . *concavus* sp. nov.

40. Mesal margin of metacoxa with a weakly sclerotised longitudinal carina 41

Mesal margin of metacoxa simple (fig. 16a) 43

41. Head with sides behind compound eyes only slightly convergent posteriorly (fig. 10b); anterior one-third of T2 with sparse to moderate and fine to medium punctation, interspaces subequal to puncture diameter 42

Head with sides behind compound eyes strongly convergent posteriorly and merging with weakly convex posterior margin (fig. 10a); anterior one-third of T2 with dense medium punctation, interspaces narrower than puncture diameter; (genitalia as in fig. 56); Namibia, South Africa . . . . . *testaceus* Bischoff.

42. Frons without a scrobal carina; free border of clypeus slightly protruding in a rounded arch (fig. 12d); S3-S6 with subequal numbers of decumbent and erect setae; (genitalia as in fig. 57); Angola, Namibia . . . . . *inornatus* sp. nov.

Frons with a scrobal carina; free border of clypeus strongly protruding in a rounded arch (fig. 12c); S3-S6 with setae decumbent; (genitalia as in fig. 58); Angola, Namibia, South Africa . . . . . *lividus* André.

43. Mesotibia with macrosetae shorter than shorter spur; S3-S6 with erect setae longer than shorter mesotibial spur 44

Mesotibia with macrosetae as long as or longer than shorter spur; S3-S6 with erect setae shorter than shorter mesotibial spur; (genitalia as in fig. 59); Namibia, South Africa . . . . . *imbellis* (André).

44. T2-T6 same colour as mesosoma; frons with a distinct mesal longitudinal groove between toruli and scrobal carina; anterior one-third of T2 with sparse fine punctation 45

T2-T6 darker than mesosoma; frons with no or a slight mesal longitudinal groove between toruli and scrobal carina; anterior one-third of T2 with moderate medium punctation; (genitalia as in fig. 60); Namibia, South Africa . . . . . *pallidior* Bischoff.

45. Mesepisternum with a scrobe; free border of clypeus with mesal area protruding, protrusion subsquare (fig. 12b); genitalia (fig. 61) with paramere distally slender and slightly recurved, apically with a carina on mesal margin, lateral margins with long setae; Namibia . . . . . *tortilis* sp. nov.

Mesepisternum without a scrobe or only a slight concavity; free border of clypeus with mesal area protruding, protrusion arched (fig. 12c); genitalia (fig. 62) with paramere distally blunt and

straight, apically with a carina on lateral margin, lateral margin with short setae; Angola, Namibia ..... *petiolatus* sp. nov.

46. Ventral surface of metafemur without clumping of macrosetae, macrosetae shorter than shorter tibial spur 47

Ventral surface of metafemur with macrosetae clumped, forming a brush border, macrosetae increasing in length distally with distal setae longer than shorter tibial spur; (genitalia as in fig. 63); Tunisia, Algeria, Libya, Mauritania, Niger, Chad, Togo ..... *pallidicornis* Bischoff.

47. Anterior one-third of T2 with longitudinal rectangular reticulations or costulate 48

Anterior one-third of T2 with moderate medium punctation 49

48. Inner mandibular tooth acute (fig. 11c); mesal margin of metacoxa simple (fig. 16a); metatibia with macrosetae shorter than shorter spur; anterior two-thirds of T2 strongly reticulate or entirely costulate, posterior one-third punctate; (genitalia as in fig. 64); Yemen, South Yemen ..... *scorteccii* Invrea.

Inner mandibular tooth subrounded (fig. 11b); mesal margin of metacoxa with a longitudinal carina 0.5 X length of coxa, carina ending posteriorly in a denticle (fig. 16g); metatibia with macrosetae longer than shorter spur; anterior one-third of T2 with longitudinal rectangular reticulations, posterior two-thirds punctate; (genitalia as in fig. 67); Egypt, Niger, Ethiopia, Djibouti, Somalia, Saudi Arabia, Yemen, Oman ..... *arabicus* Suárez.

49. Free border of clypeus entirely convex (fig. 12e); mesal margin of metacoxa simple (fig. 16a) or with a longitudinal carina (fig. 16h), carina never angulate posteriorly; anterior mesal area of S2 with a carina 50

Free border of clypeus with mesal area weakly truncate; mesal margin of metacoxa with an arched protruding carina < 0.6 X length of coxa, carina slightly angulate posteriorly (fig. 16g); anterior mesal area of S2 without a carina; (genitalia as in fig. 66); Morocco, Mauritania, Algeria, Tunisia, Libya ..... *saharicus* Suárez.

50. Mesepisternal groove absent; mesobasitarsus straight; anterior mesal area of S2 with a carina > 0.25 X length of sternum 51

Mesepisternal groove present; mesobasitarsus, in lateral view, curved ventrally; anterior mesal area of S2 with a carina < 0.25 X length of sternum; (genitalia as in fig. 65); United Arab Emirates, Oman ..... *luridus* sp. nov.

51. Metasoma golden yellow to pale yellowish-brown, sometimes with T4-T6 darker than anterior terga; mesal margin of metacoxa with a longitudinal carina 0.7 X length of coxa (fig. 16h); S2 without a felt line; (genitalia as in fig. 69); Saudi Arabia ..... *indistinctus* sp. nov.

T1 entirely medium yellowish-brown, T2-T6 dark reddish-brown; mesal margin of metacoxa

simple (fig. 16a); S2 with a felt line; (genitalia as in fig. 70); Mauritania, Libya, Niger, Nigeria, Sudan, Ethiopia, Israel, Saudi Arabia, Iran . . . . . *niloticus niloticus* Suárez.

9.3. SPECIES DESCRIPTIONS

***Tricholabiodes denticulatus* sp. nov. ♂**

DIAGNOSIS

MALE: Metasoma with anterior regions of T1 medium yellowish-brown becoming darker posteriorly, T2-T6 dark reddish-brown, sterna paler than corresponding terga. Head with sides behind compound eyes distinctly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with scrobal carina absent. Vertex dorsally strongly convex with lateral surface sloping steeply towards compound eye. Ocelli small, ocellocular distance 2-3 X width of lateral ocellus. Free border of clypeus with mesal area strongly protruding in a slightly upwardly flexed arch. Ventral margin of mandible slightly excised, subtending tooth minute. Pronotum with anterior portion of lateral surface with moderate medium punctation, punctation increasing in density posteriorly. Mesoscutum with posterolateral corner flat. Mesepisternum entirely punctate. Mesosternum with anteromesal surface, on each side of midline, with two conical protuberances. Forewing with surface area of pterostigma greater than surface area of marginal cell, 2nd submarginal cell petiolate anteriorly. Mesal margin of metacoxa with slight longitudinal carina > 0.6 X length of coxa. Anterior mesal area of S2 without carina; S2 without felt line. Genitalia as in fig. 54.

DESCRIPTION

MALE: Length 5.64 (5.64-9.52, mean 6.88) mm. Head, including clypeus and antenna, pale to medium yellowish-brown; mandible almost entirely pale yellowish-brown, apex medium black, ventral tooth dark yellowish-brown; mesosoma medium yellowish-brown; legs, including coxae, pale yellowish-brown, tibial spurs golden yellow; forewing lightly infuscated posterior to pterostigma; pterostigma and wing veins pale yellowish-brown; metasoma with T1 anteriorly medium yellowish-brown becoming darker posteriorly, T2-T6 dark reddish-brown, sterna paler than corresponding terga; entire body, particularly head and metasoma, covered in long, pallid setae.

Head transverse, 1.50 (1.43-1.55, mean 1.50) X as wide as long, 0.96 (0.88-0.96, mean 0.92) X as wide as mesosoma, 1.32 (1.24-1.37, mean 1.31) X as wide as vertex, 1.65 (1.65-1.74, mean 1.70) X as long as compound eye, sides behind compound eyes slightly convergent posteriorly and merging with weakly

convex posterior margin. Frons with moderate fine punctation anteriorly, interspaces shiny and narrower than puncture diameter, punctation increasing in size and density posteriorly; foveola shallow; surface between median ocellus and foveola without longitudinal median groove, smooth and impunctate, between toruli longitudinal median groove slight; scrobal carina absent, scrobal tubercle small; antennal tubercle simple, irregular, shiny, with sparse fine punctation. Vertex 0.47 (0.47-0.53, mean 0.50) X as long as wide, 1.36 (1.30-1.44, mean 1.36) X as wide as frons; dorsally strongly convex with lateral surface sloping steeply towards compound eye; posterior to lateral ocellus with moderate medium punctation, interspaces shiny and subequal to puncture diameter. Compound eye with ommatidia distinct. Ocelli small, ocellocular distance 2-3 X width of lateral ocellus, median ocellus 1.02 (0.98-1.20, mean 1.06) X as long as wide, interocellar distance 0.62 (0.54-0.64, mean 0.61) X ocellocular distance. Gena with moderate medium punctation, interspaces shiny. Clypeus 0.58 (0.54-0.58, mean 0.56) X as high as wide, free border with mesal area strongly protruding in a slightly upwardly flexed arch; central portion raised, with slight oval mesal depression, depression subrounded in section, with sparse fine punctation, interspaces > 2 X puncture diameter; vestiture length subequal to height of clypeus, inconspicuous. Mandible higher than thick, dorsal rim with carina along entire length, ending at junction between middle and inner teeth; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth adjacent, inner tooth subrounded; mesal margin smooth; ventral margin slightly excised, subtending tooth minute, mandibular height across ventral tooth 0.57 (0.57-0.83, mean 0.69) X height at base. Antenna with scape 2.53 (2.35-2.61, mean 2.52) X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere simple; second flagellomere 1.85 (1.65-1.85, mean 1.72) X length of first, 1.06 (1.04-1.12, mean 1.07) X length of third.

Mesosoma, excluding anterior collar, 1.78 (1.63-1.78, mean 1.70) X as long as wide. Pronotum 0.82 (0.80-0.84, mean 0.82) X as wide as mesosoma, anterodorsal surface mesally with fine punctation, interspaces irregular, with punctures increasing in density and size laterally, slightly convex, humeral angle subrounded; anterior portion of lateral surface with moderate medium punctation, lateral epaulet distinct and almost as large as a puncture; posterior portion of lateral surface with sparse fine punctation, interspaces irregular and wider than puncture diameter, posterior margin impunctate. Mesoscutum 0.38 (0.35-0.38, mean 0.37) X as long as wide, 0.98 (0.98-1.09, mean 1.04) X as wide as pronotum; between notauli with moderate medium punctation, interspaces smooth and subequal to puncture diameter; laterally with sparse medium punctation, interspaces shiny and wider than puncture diameter, posterolaterally with dense medium punctation; posterolateral corner flat. Scutellum subsquare, entire dorsal surface sparsely covered with medium subcircular punctation, interspaces shiny and wider than puncture diameter. Dorsellum almost entirely with moderate medium punctation, mesally

smooth, laterally ridged. Propodeum with areola longer than 2 neighbouring areae. Mesepisternum, anterior to mesepisternal groove with moderate fine punctation, punctation becoming denser posteriorly, posterior to mesepisternal groove with dense subcircular punctation, punctures approximately same size as those on anterior portion of lateral surface of pronotum, punctures decreasing in size and density posteriorly; scrobe a distinct subrectangular depression, mesepisternal groove slight. Mesosternum with anterior concavity nearly impunctate, shiny, posteriorly becoming moderately to densely punctate, punctures medium and ill-defined; anteromesal surface, on each side of midline, with two conical protuberances.

Forewing: Pterostigma 1.86 (1.85-2.58, mean 2.10) X length of anterior margin of marginal cell; area of pterostigma > area of marginal cell. Marginal cell 1.65 (1.65-2.31, mean 1.92) X as long as wide, 1.34 (1.23-1.37, mean 1.30) X length of second submarginal. Second submarginal cell petiolate anteriorly, 0.30 (0.30-0.34, mean 0.32) X length of discoidal cell. Third submarginal cell with vein 3r-m tubular anterior to junction with accessory vein, nebulous posterior to junction with accessory vein, becoming spectral posteriorly; medial vein absent; accessory vein nebulous, 3.2 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur simple with greatest width at midlength; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.80 (0.69-0.86, mean 0.78) X length of longer spur, longer spur almost straight; basitarsus straight. Hind leg: Coxa entirely with sparse punctation, interspaces wider than puncture diameter, mesal margin with slight longitudinal carina > 0.6 X length of coxa but sometimes indistinct, ventral surface flat; trochanter simple; femur with macrosetae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae sparsely but evenly distributed, shorter than shorter spur, shorter spur 0.71 (0.63-0.82, mean 0.73) X length of longer spur, longer spur almost straight, 0.71 (0.71-0.91, mean 0.79) X length of basitarsus; basitarsus with dense microsetae, macrosetae absent, ventral surface with an indistinct row of short spines.

Metasoma 2.17 (2.02-2.17, mean 2.07) X as long as wide. First segment very broad and short, slightly constricted at apex, 0.74 (0.67-0.77, mean 0.71) X as long as wide, 0.40 (0.37-0.42, mean 0.40) X as long as T2; tergum, except tergulum, with dense coarse subcircular punctation, tergulum with moderate fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum with moderate fine punctation anteriorly becoming densely punctate posteriorly, median carina continuous. T2 0.88 (0.88-0.94, mean 0.92) X as long as wide, 0.96 (0.95-0.97, mean 0.96) X as wide as mesosoma, vestiture subdecumbent to suberect, anterior one-third with moderate

medium punctation, interspaces shiny and narrower than puncture diameter, posterior two-thirds with moderate and fine to medium punctation, interspaces shiny, felt line 0.34 (0.32-0.42, mean 0.35) X length of tergum, length anterior to felt line 0.81 (0.74-0.91, mean 0.81) X length of tergum posterior to felt line; S2 convex, setae evenly distributed and shorter than shorter mesotibial spur, entirely with moderate medium subcircular punctation, interspaces anteriorly irregular becoming smooth posteriorly, anterior mesal area without carina, felt line absent. Pygidium with posterior margin strongly convex, anterior one-third sparsely punctate, interspaces smooth and wider than puncture diameter, pygidial plate entirely smooth, except lateral and posterior margin finely punctured; hypopygium with posterior margin square, mesal area simple. Genitalia as in fig. 54.

FEMALE: Unknown.

MATERIAL EXAMINED

TYPE MATERIAL. Holotype: ♂, "SOUTH AFRICA, CAPE PROV [= Northern Cape] / Richtersveld, Numees / Mine, 28°18'S 16°58'E / 16-20.ii.1979, Lamoral, / Bampton & Barnley" (SAMC).

Measured paratypes: 4♂: same data (4♂, DJBC).

DISTRIBUTION

This species occurs only in South Africa, with five specimens recorded from one locality, the Richtersveld National Park (fig. 71).

DISCUSSION

This species is most similar to *T. nodosus* from which it differs mainly in the shape of the free border of the clypeus, sculpturing of the dorsellum, protuberances on the mesosternum and shape of the second submarginal cell. In *T. denticulatus*, the free border of the clypeus has the mesal area strongly protruding in a slightly upwardly flexed arch, the dorsellum is laterally ridged, and the second submarginal cell is anteriorly petiolate. In *T. nodosus*, the free border of the clypeus has the mesal area convex with a rounded tubercle on each side of midline, the dorsellum is laterally simple, and the second submarginal cell is anteriorly sessile.

ETYMOLOGY

"*denticulatus*" (L.), with small teeth; in reference to the minute subtending mandibular tooth.

***Tricholabiodes nodosus* Bischoff, 1920. ♂**

Mutilla semele Péringuey, 1898:86 (in part). ♂

[*Tricholabioides* [*sic*]] *nodosa* [*sic*] Bischoff, 1920:103, 107. ♂

[*Tricholabioides* [*sic*]] *nodosa* [*sic*] Bischoff; Suárez, 1990:186. ♂

Mutilla semele Péringuey (in part); Brothers (MS). ♂

DIAGNOSIS

MALE: Metasoma with anterior regions of T1 medium yellowish-brown becoming darker posteriorly, T2-T6 dark reddish-brown, sterna paler than corresponding terga. Head with sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with scrobal carina absent. Vertex dorsally strongly convex with lateral surface sloping steeply towards compound eye. Ocelli small, ocellocular distance 1.25 X width of lateral ocellus. Free border of clypeus convex with a rounded tubercle on each side of midline. Ventral margin of mandible slightly excised, subtending tooth minute. Pronotum with anterior portion of lateral surface with moderate medium punctation, punctation increasing in density posteriorly. Mesoscutum with posterolateral corner flat. Mesosternum with no mesosternal processes. Forewing with surface area of pterostigma ≥ surface area of marginal cell, 2nd submarginal sessile. Mesal margin of metacoxa with strong longitudinal carina > 0.6 X length of coxa. Anterior mesal area of S2 without carina; S2 without felt line. Genitalia as in fig. 28.

REDESCRIPTION

MALE: Length 8.85 (6.95-9.77, mean 8.03) mm. Head, including clypeus and antenna, pale to medium yellowish-brown; mandible almost entirely pale yellowish-brown, apex medium black, ventral tooth dark yellowish-brown; mesosoma medium yellowish-brown; legs, including coxae and tibial spurs, pale yellowish-brown; forewing lightly infuscated posterior to pterostigma; pterostigma and wing veins pale yellowish-brown; metasoma with T1 anteriorly medium yellowish-brown becoming darker posteriorly, T2-T6 dark reddish-brown, sterna paler than corresponding terga; entire body covered in long pallid setae.

Head transverse, 1.47 (1.38-1.56, mean 1.45) X as wide as long, 0.92 (0.83-0.98, mean 0.90) X as wide as mesosoma, 1.40 (1.30-1.46, mean 1.38) X as wide as vertex, 1.62 (1.55-1.72, mean 1.63) X as long as compound eye, sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with moderate medium punctation, interspaces shiny and

subequal to puncture diameter; foveola absent; surface between median ocellus and foveola without longitudinal median groove, smooth and impunctate, between toruli longitudinal median groove slight; scrobal carina absent, scrobal tubercle with slight transverse carina on either side, inner carina slightly arcuate, length < half distance of scrobal tubercle to antennal tubercle, outer carina length < half distance of scrobal tubercle to compound eye; antennal tubercle simple, irregular, shiny, with sparse fine punctation. Vertex 0.60 (0.50-0.69, mean 0.56) X as long as wide, 1.29 (1.14-1.41, mean 1.33) X as wide as frons; dorsally strongly convex with lateral surface sloping steeply towards compound eye; posterior to lateral ocellus with sparse to moderate, medium punctation, interspaces shiny. Compound eye with ommatidia distinct. Ocelli small, ocellocular distance 1.25 X width of lateral ocellus, median ocellus 0.87 (0.84-1.04, mean 0.92) X as long as wide, interocellar distance 0.77 (0.74-0.99, mean 0.84) X ocellocular distance. Gena with sparse to moderate, medium punctation, interspaces shiny. Clypeus 0.33 (0.33-0.38, mean 0.35) X as high as wide, free border convex with a rounded tubercle on each side of midline; central portion raised, slightly convex with longitudinally oval mesal depression, depression subrounded in section, with sparse fine punctation, interspaces 2 X puncture diameter; vestiture length subequal to height of clypeus. Mandible higher than thick, dorsal rim with weak carina along entire length, ending at junction between middle and inner teeth; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth adjacent, inner tooth subrounded; mesal margin smooth; ventral margin slightly excised, subtending tooth minute, mandibular height across ventral tooth 0.62 (0.56-0.78, mean 0.62) X height at base. Antenna with scape 2.87 (2.12-3.17, mean 2.60) X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere simple; second flagellomere 2.05 (1.80-2.12, mean 1.78) X length of first, 1.08 (0.99-1.18, mean 1.05) X length of third.

Mesosoma, excluding anterior collar, 1.72 (1.45-1.72, mean 1.67) X as long as wide. Pronotum 0.91 (0.87-0.96, mean 0.91) X as wide as mesosoma, anterodorsal surface mesally finely punctate, interspaces irregular, with punctures increasing in density and size laterally, slightly convex, humeral angle subrounded; anterior portion of lateral surface with dense coarse punctation, lateral epaulet distinct and almost as large as a puncture; posterior portion of lateral surface rough striated, posterior margin impunctate. Mesoscutum 0.79 (0.76-0.85, mean 0.80) X as long as wide, 0.91 (0.86-0.99, mean 0.89) X as wide as pronotum; entirely with sparse medium punctation, interspaces smooth and wider than puncture diameter, posterolaterally with dense medium punctation; posterolateral corner flat. Scutellum subsquare, entire dorsal surface sparsely to moderately covered with medium subcircular punctation. Dorsellum irregular with sparse to moderate, medium punctation, laterally simple. Propodeum with areola longer than 2 neighbouring areae. Mesepisternum with pit-like, shallow reticulations, reticulations

approximately same size as punctation on anterior portion of lateral surface of pronotum, scrobe indistinct, mesepisternal groove absent. Mesosternum with anterior concavity nearly impunctate, shiny, posteriorly becoming moderately to densely punctate, punctures medium and ill-defined; no mesosternal processes.

Forewing: Pterostigma 1.88 (1.74-2.26, mean 1.90) X length of anterior margin of marginal cell; area of pterostigma ≥ area of marginal cell. Marginal cell 2.34 (1.98-2.72, mean 2.30) X as long as wide, 1.09 (1.06-1.45, mean 1.30) X length of second submarginal. Second submarginal cell sessile anteriorly, 0.41 (0.29-0.41, mean 0.35) X length of discoidal cell. Third submarginal cell with vein 3r-m tubular anterior to junction with accessory vein, nebulous becoming absent posterior to junction with accessory vein; medial vein absent; accessory vein nebulous, decreasing in pigmentation posteriorly, 3 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur simple with greatest width at midlength; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.70 (0.63-0.77, mean 0.69) X length of longer spur, longer spur almost straight; basitarsus straight. Hind leg: Coxa entirely with sparse punctation, interspaces wider than puncture diameter, mesal margin with strong longitudinal carina > 0.6 X length of coxa, ventral surface convex; trochanter simple; femur with macrosetae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae sparsely but evenly distributed, shorter than shorter spur, shorter spur 0.69 (0.60-0.75, mean 0.66) X length of longer spur, longer spur almost straight, 0.88 (0.68-0.88, mean 0.75) X length of basitarsus; basitarsus with dense microsetae, macrosetae absent, ventral surface with an indistinct row of short spines.

Metasoma 1.37 (0.96-1.53, mean 1.25) X as long as wide. First segment broad, slightly constricted at apex, 1.95 (1.63-1.98, mean 1.74) X as long as wide, 2.67 (2.17-2.67, mean 2.45) X as long as high, 1.07 (0.94-1.15, mean 1.02) X as long as T2; tergum, except tergulum, with dense coarse subcircular punctation, tergulum with moderate fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum with dense medium punctation, median carina along anterior one-third. T2 0.88 (0.76-0.91, mean 0.85) X as long as wide, 1.04 (0.98-1.06, mean 1.02) X as wide as mesosoma, vestiture subdecumbent to suberect, anterior one-third with moderate, fine to medium punctation, interspaces shiny and subequal to puncture diameter, posterior two-thirds with moderate fine punctation, interspaces shiny and subequal to puncture diameter, felt line 0.50 (0.39-0.57, mean 0.96) X length of tergum, length anterior to felt line 0.81 (0.64-1.07, mean 0.79) X length of tergum posterior to felt line; S2 convex, setae evenly distributed and shorter than shorter mesotibial spur,

entirely with moderate medium subcircular punctation, interspaces anteriorly irregular becoming smooth posteriorly, anterior mesal area without carina, felt line absent. Pygidium margin with posterior margin strongly convex, anterior one-third with sparse punctation, interspaces smooth and wider than puncture diameter, pygidial plate entirely smooth although surface slightly irregular; hypopygium with posterior margin convex, mesal area simple. Genitalia as in fig. 28.

FEMALE: Unknown.

MATERIAL EXAMINED

TYPE MATERIAL. Holotype: ♂, "D. S.W.-Afrika [= NAMIBIA] / Windhoek [22°34'S 17°06'E] / Techow S."; "Type"; "*nodosa* [*sic*] / Bisch.*" (ZMHB).

MEASURED MATERIAL. 19♂: NAMIBIA: [1](K. Jordan, Brit. Mus. 1934-110) (1♂, NHML); [2,14,15]Kaokoland, Epembe, 17°34'S 13°32'E, 5-11.xi.1989 (C.S. Roberts) (3♂,SMWH); [9]Ondangua, 24 mi. SE., 1100 m, 17°55'S 15°57'E, 17.xii.1966 (E.S. Ross & K. Lorenzen) (1♂, CASC); [6]Tsumeb to Asis, 19°13'S 17°42'E, 19.xi.1933 (K. Jordan, Brit. Mus. 1934-110) (1♂, NHML); [7]Karibib Dist., 47 km S. Wilhelmstal, Okandukaseibe Farm No. 27, 22°20'S 16°21'E, 13.xi.1972 (C.L. Hogue) (1♂, UCRC); [16, 17]Swakopmund, 40 mi. E., 1200 m, 22°40'S 14°34'E, 24.xii.1966 (E.S. Ross & K. Lorenzen) (2♂, CASC); [8, 18]Namib/Naukluft Park, Ganab, 23°06'S 15°33'E, 16.iii.1983 (C.D. Eardley) light trap (2♂, NCSA); [10]Kuiseb Canyon (22), 23°18'S 15°45'E, 22-23.i.1972 (Southern African Exp., B.M. 1972-1) (1♂, NHML); [11]Rehoboth, 23°18'S 17°03'E, 4.ii.1995 (P.S. Bayliss) light trap (1♂, DJBC); [4, 19]Namib/Naukluft Park, Kuiseb R. nr Gobabeb, 23°34'S 15°03'E, 18.ii.20.iii.1983 (Nat. Coll. Kuiseb Survey) malaise trap (2♂, NCSA); [12]Kiries West, 26°35'S 18°57'E, xii.1925 (J.S. Brown) (2♂, SAMC); [5]Fish River Canyon, Hobas Camp, 27°40'S 17°45'E, 1.ii.1995 (P.S. Bayliss) light trap (1♂, DJBC). SOUTH AFRICA: [13]N. Cape Province, Witsand Farm, 28°32'S 22°30'E, 2-4.ii.1979 (Lamoral, Bampton & Barnley) (1♂, DJBC); [3]Van Wyk's Vley, 32°07'S 19°43'E, ii.1885 (E. Alston, SAM-HYM-A018414) *det.* by Péringuey as *Dasylabroides semele* Py, *designated and det.* by Brothers as PARALECTOTYPE *Mutilla semele* ♂ Péringuey 1898, *det.* by Brothers as *not M. semele* (♂, SAMC).

ADDITIONAL MATERIAL. 68♂: NAMIBIA: Kalkfontein, 22°08'S 20°53'E, x.1926 (J.S. Brown) (1♂, SAMC); Swakopmund, 40 mi. E., 1200 m, 22°40'S 14°34'E, 24.xii.1966 (E.S. Ross & K. Lorenzen) (5♂, CASC); Namib/Naukluft Park, Ganab, 23°06'S 15°33'E, 16.iii.1983 (C.D. Eardley) light trap (5♂, NCSA); Kuiseb Canyon (22), 23°18'S 15°45'E, 22-23.i.1972 (Southern African Exp., B.M. 1972-1) (3♂, NHML); Rehoboth; 23°18'S 17°03'E, 4.ii.1995 (P.S. Bayliss) light trap (6♂,

DJBC); Windhoek Dist., Gamsberg foot E., 23°20'S 16°15'E, 14.x.1984 (J. Irish, H61918) (1♂, SMWH); Windhoek District, Christirina 259, Nouas, 23°25'S 18°03'E, 21.xi.1989 (C.S. Roberts) (1♂, SMWH); Namib/Naukluft Park, Kuiseb R. nr Gobabeb, 23°34'S 15°03'E, 18.ii-20.iii.1983 (Nat. Coll. Kuiseb Survey) malaise trap (10♂, NCSA);(23) Homeb, 10 mls ESE. Gobabeb, 23°38'S 15°11'E, 23-25.i.1972 (Southern African Exp. B.M. 1972-1) general sweeping (2♂, NHML); Mariental, 60 km S., 24°40'S 17°59'E, 2.ii.1995 (P.S. Bayliss) light trap (1♂, DJBC); Kiries West, 26°35'S 18°57'E, xii.1925 (J.S. Brown) (24♂, SAMC); Fish River Canyon, nr main lookout point, 27°40'S 17°35'E, 31.xii.1974 (M.W. Mansell) (3♂, NCSA); Fish River Canyon, Hobas Camp, 27°40'S 17°45'E, 1.ii.1995 (P.S. Bayliss) light trap (4♂, DJBC). SOUTH AFRICA: Pofadder, 29°09'S 19°27'E, 26.i.1995 (P.S. Bayliss) light trap (1♂, DJBC). Locality indefinite: NAMIBIA: Abachaus, xi.1946 (G. Hobohm) (1♂,TMSA); (K. Jordan, Brit. Mus. 1934-110) (1♂, NHML).

DISTRIBUTION

This species occurs in southern Africa, with specimens recorded from central and southern Namibia and northwestern South Africa (fig. 71).

DISCUSSION

Bischoff (1920) described this species from a single male, collected by S. Techow. The description, which refers only to coloration, shape of T1 and sculpturing of T2, is vague, serving more as a diagnosis. There have been no subsequent redescriptions of *T. nodosus*, nor has this species been included in any key, besides that of Bischoff (1920). Suárez (1990) included *T. nodosus* in a catalogue of virtually all described species of *Tricholabiodes*.

One specimen (from "Wyk's Vly, 11.11.[18]85, E.G. Alston." and headless) is considered by Brothers (MS) to form part of the syntype series of *M. semele*. Brothers (MS), in studying the five specimens making up the syntype series, designated one as the lectotype and appropriately attached a paralectotype label to each of the others. Brothers realized that the headless specimen is not conspecific with the other four; it is identified here as *T. nodosus*. Brothers (1983) determined that *M. semele* is a junior synonym of *M. imbellis* André.

Tricholabiodes nodosus is most similar to *T. denticulatus*. These two species can be separated by the shape of the free border of the clypeus, sculpturing of the dorsellum and the shape of the second submarginal cell. In *T. nodosus*, the free border of the clypeus is convex with a rounded tubercle on each side of the midline, the dorsellum is laterally simple and the second submarginal cell is anteriorly

sessile. In *T. denticulatus*, the free border of the clypeus has the mesal area strongly protruding in a slightly upwardly flexed arch, the dorsellum is laterally ridged and the second submarginal cell is anteriorly petiolate.

***Tricholabiodes disgregus* sp. nov. ♂**

DIAGNOSIS

MALE: Metasoma with anterior two-thirds of T1 medium yellowish-brown becoming pale to dark reddish-brown posteriorly, T2-T6 entirely black, lateral areas of all terga and sterna dark reddish-black. Head with sides behind compound eyes subparallel, distinct from weakly convex posterior margin. Free border of clypeus strongly anteriorly protruding and truncated; central portion depressed. Mandible broadly dilated, mesal margin toothed. Anterior surface of scape with two longitudinal parallel carinas, approximately two-thirds length of scape. Humeral angle of mesosoma strongly acute. Mesosternum with anterior concavity transversely ridged; anteromesal surface, on each side of midline, swollen with transverse ridges. Mesal margin of mesocoxa with longitudinal carina ≥ 0.5 X length of coxa; tibia laterally enlarged on distal half. Mesal margin of metacoxa with longitudinal carina > 0.6 X length of coxa; posteromesal margin, below carina, with tuft of setae. Anterior mesal area of S2 without carina, posterolateral surface with diagonal transverse tubercle. S4-S6 with setae clumped, erect and longer than smaller mesotibial spur. Posterior margin of hypopygium shallowly concave. Genitalia as in fig. 52.

DESCRIPTION

MALE: Length 11.44 (8.44-11.78, mean 10.26) mm. Head, including clypeus and antenna, medium yellowish-brown; mandible almost entirely pale yellowish-brown, apex medium black, ventral tooth pale to dark reddish-black; mesosoma and legs, including coxae, medium to dark yellowish-brown, tibial spurs golden yellow; forewing entirely darkly infuscated; pterostigma medium to dark reddish-black; wing veins dark yellowish-brown to pale reddish-black; metasoma with T1 entirely medium yellowish-brown, except posterior portion of dorsal surface pale to dark reddish-brown, T2-T6 entirely black, lateral areas of all terga and sterna dark reddish-black; entire body covered in long, pallid setae.

Head 1.48 (1.31-1.48, mean 1.39) X as wide as long, 0.86 (0.86-0.99, mean 0.92) X as wide as mesosoma, 1.44 (1.42-1.51, mean 1.47) X as wide as vertex, 1.60 (1.60-2.07, mean 1.84) X as long as compound eye, sides behind compound eyes subparallel, distinct from weakly convex posterior margin. Frons with dense, fine to medium punctation, interspaces shiny and narrower than puncture diameter;

foveola shallow; surface between median ocellus and foveola without longitudinal median groove, between toruli longitudinal median groove subrounded in section and shallow but sometimes indistinct; scrobal carina absent, scrobal tubercle with slight transverse carina on either side, inner carina slightly arcuate, length < half distance of scrobal tubercle to antennal tubercle, outer carina length < half distance of scrobal tubercle to compound eye; antennal tubercle irregular, shiny, sparsely and finely punctate, anteriorly ridged. Vertex 0.64 (0.64-0.79, mean 0.74) X as long as wide, 1.30 (1.22-1.34, mean 1.28) X as wide as frons; posterior to lateral ocellus with moderate to dense, medium punctation, interspaces irregular and narrower than puncture diameter. Compound eye with ommatidia distinct. Ocelli small, convex and round, median ocellus 0.86 (0.81-0.97, mean 0.86) X as long as wide, interocellar distance 0.98 (0.85-0.98, mean 0.91) X ocellocular distance. Gena with moderate to dense, medium punctation, punctures sometimes becoming sparse posteriorly, interspaces shiny. Clypeus 0.37 (0.32-0.38, mean 0.36) X as high as wide, free border strongly anteriorly protruding and truncated; central portion depressed, impunctate; vestiture sparse and length subequal to height of clypeus. Mandible broadly dilated, dorsal rim with carina along entire length, ending at base of inner tooth; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth adjacent, inner tooth subrounded; mesal margin toothed; ventral margin strongly excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 0.76 (0.60-0.83, mean 0.68) X as height at base, distal portion slender. Antenna with scape 2.11 (1.99-2.18, mean 2.16) X length of first flagellomere, anterior surface with two longitudinal parallel carinas, approximately two-thirds length of scape; first flagellomere simple; second flagellomere 1.70 (1.67-1.98, mean 1.72) X length of first, 1.05 (1.02-1.10, mean 1.07) X length of third.

Mesosoma, excluding anterior collar, 1.52 (1.52-1.69, mean 1.58) X as long as wide. Pronotum 0.82 (0.79-0.88, mean 0.84) X as wide as mesosoma, anterodorsal surface with moderate medium punctation mesally becoming pit-like shallow reticulations laterally, strongly convex, humeral angle strongly acute; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct and as large as a reticulation; posterior portion of lateral surface slightly rough striated becoming sparsely and finely punctate, interspaces irregular and wider than puncture diameter, posterior margin impunctate. Mesoscutum 0.77 (0.77-0.81, mean 0.79) X as long as wide, 0.93 (0.89-0.96, mean 0.92) X as wide as pronotum; entirely with moderate medium punctation, interspaces smooth and subequal to puncture diameter; posterolateral corner raised as an angulate tooth. Scutellum subsquare, entire dorsal surface sparsely covered with medium subcircular punctation, interspaces irregular. Dorsellum irregular with dense fine punctation, laterally ridged. Propodeum with areola same length as neighbouring areae. Mesepisternum with pit-like, shallow reticulations, reticulations approximately same size as those on

anterior portion of lateral surface of pronotum, scrobe a distinct subcircular depression, mesepisternal groove present. Mesosternum with anterior concavity transversely ridged, posteriorly smooth; anteromesal surface, on each side of midline, swollen with transverse ridges.

Forewing: Pterostigma 0.84 (0.62-0.87, mean 0.77) X length of anterior margin of marginal cell. Marginal cell 2.93 (2.34-3.13, mean 2.77) X as long as wide, 1.63 (1.53-1.68, mean 1.60) X length of second submarginal. Second submarginal cell sessile anteriorly, 0.40 (0.34-0.41, mean 0.38) X length of discoidal cell. Third submarginal cell with vein 3r-m tubular anterior to junction with accessory vein, nebulous posterior to junction with accessory vein; medial and accessory veins nebulous, accessory vein 1.35 X longer than marginal cell.

Legs. Mid leg: Coxa mesal margin with longitudinal carina ≥ 0.5 X length of coxa; femur simple with greatest width at midlength; tibia laterally enlarged on distal half, macrosetae shorter than shorter spur, shorter spur 0.74 (0.59-0.75, mean 0.71) X length of longer spur, longer spur slightly mesally curved; basitarsus straight. Hind leg: Coxa entirely with sparse punctation, interspaces wider than puncture diameter, mesal margin with longitudinal carina > 0.6 X length of coxa, posteromesal margin, below carina, with tuft of setae, ventral surface convex, coxa tapering from base to apex; trochanter simple; femur with macrosetae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae sparsely but evenly distributed, shorter than shorter spur, shorter spur 0.67 (0.63-0.69, mean 0.67) X length of longer spur, longer spur almost straight, 0.66 (0.60-0.67, mean 0.64) X length of basitarsus; basitarsus with dense microsetae, macrosetae absent, ventral surface with two, often indistinct, rows of short stout spines.

Metasoma 1.32 (1.15-1.39, mean 1.29) X as long as wide. First segment broad and slightly constricted at apex, 1.62 (1.57-1.75, mean 1.65) X as long as wide, 2.41 (2.23-2.61, mean 2.36) X as long as high, 1.26 (1.16-1.36, mean 1.22) X as long as T2; tergum, except tergulum, with moderate medium punctation, tergulum with moderate fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum anteriorly smooth with punctation becoming denser and coarser posteriorly, median carina continuous. T2 0.74 (0.63-0.83, mean 0.75) X as long as wide, 0.95 (0.94-1.02, mean 0.99) X as wide as mesosoma, vestiture sparse, entirely with moderate medium punctation, interspaces shiny and subequal to puncture diameter, felt line 0.54 (0.47-0.61, mean 0.51) X length of tergum, tergum length anterior to felt line 0.82 (0.71-1.14, mean 0.94) X length of tergum posterior to felt line; S2 convex, setae evenly distributed and shorter than shorter mesotibial spur, entirely with dense medium punctation, interspaces irregular and narrower than puncture diameter,

anterior mesal area without carina, felt line absent, posterolateral surface with diagonal transverse tubercle. S4-S6 with setae clumped, erect and longer than smaller mesotibial spur. Pygidium transverse, posterior margin strongly convex, anterior one-third with moderate dense punctation, interspaces smooth and subequal to puncture diameter, pygidial plate almost entirely impunctate, surface irregular, lateral and posterior margin finely punctured; hypopygium with posterior margin shallowly concave, mesal area simple. Genitalia as in fig. 52.

FEMALE: Unknown.

MATERIAL EXAMINED

TYPE MATERIAL. Holotype: ♂, "NAMIBIA. Mariental / 60 km S. light trap / 24.34s 18.00e / 02.ii.1995 P. Bayliss" (SMWH).

Measured paratypes: 5♂: NAMIBIA: [4]Kalkfontein, 22°08'S 20°53'E, iii.1923 (J.S. Brown) *det.* as *Tricholabiodes* (1♂, SAMC); [1]Mariental, 60 km S., 24°35'S 18°00'E, 2.ii.1995 (P. Bayliss) light trap (1♂, DJBC); [3]Asab, 25°29'S 17°59'E, x.1925 (J.S. Brown) (1♂, SAMC); [5]Seeheim, 26°50'S 17°45'E, 18.iv.1933 (G. von Son) *det.* by Invrea as *Tricholabiodes* (1♂, TMSA); [2]Fish River Canyon, nr main lookout Point, 27°40'S 17°35'E, 31.xii.1974 (M.W. Mansell) (1♂, NCSA).

Additional paratypes: 3♂: NAMIBIA: Sesriem Canyon 19, 3 mls. W. Sesriem, 24°31'S 15°46'E, 21-22.i.1972 (Southern African Exp., B.M. 1972-1) general sweeping (1♂, NHML); Mariental, 60 km S., 24°35'S 18°00'E, 2.ii.1995 (P. Bayliss) light trap (1♂, DJBC); Aus, 26°40'S 16°15'E, xii.1925 (J. S. Brown) (1♂, SAMC).

DISTRIBUTION

This species occurs in Namibia, with specimens recorded from several different localities (fig. 72).

DISCUSSION

This species is not clearly more similar to any one of the other species in the genus than to any other. It can be separated from all other species by the shape of the free border of the clypeus, mandibular shape, sculpturing and shape of the mesosternum, shape of the mesotibia, presence of tubercles on the posterolateral area of S2 and genitalia shape. The free border of the clypeus is strongly protruding and truncate, and when enclosed by the dorsoventrally thin mandibles, resembles the inside of a saucepan. The mesotibia is laterally expanded while the anteromesal surface of the mesosternum is swollen with transverse ridges. The swelling of the mesosternum, commonly seen in *Acanthophotopsis* Schuster, a genus of nocturnal mutillid wasps from North America (Schuster 1958), does not occur in any other

species of *Tricholabiodes*. The genitalia are robust with the parameres diverging towards the apex (fig. 52). All the above characters are autapomorphic, making this species easily recognizable.

ETYMOLOGY

"*disgregus*" (L.), different; in reference to this species unique combination of characters.

Tricholabiodes testaceus Bischoff, 1920. ♂

[*Tricholabioides* [*sic*]] *testacea* [*sic*] Bischoff, 1920:103, 104. ♂

[*Tricholabioides* [*sic*]] *testacea* [*sic*] BIS[C]H[OFF]; Suárez, 1963:924. ♂

[*Tricholabioides* [*sic*]] *testacea* [*sic*] Bischoff; Suárez, 1990:187. ♂

DIAGNOSIS

MALE: Body and appendages entirely golden yellow to pale yellowish-brown, except for darker mandibular apices and dark yellowish-brown ventral tooth. Head with sides behind compound eyes strongly convergent posteriorly and merging with weakly convex posterior margin. Frons with scrobal carina absent. Free border of clypeus with mesal area slightly protruding in a weak subrounded arch, arch not upwardly flexed. Middle and inner mandibular teeth adjacent. Mesepisternum with dense coarse subcircular punctation, reticulations approximately same size as those on anterior portion of lateral surface of pronotum; scrobe small; mesepisternal groove absent. Anteromesal area of mesosternum, on each side of midline, with two conical protuberances. Forewing with 2nd submarginal cell petiolate anteriorly. Mesal margin of metacoxa with longitudinal carina > 0.6 X length of coxa; tibia with macrosetae only on posterior surface with several setae anteriorly. Metasoma with anterior one-third of T2 entirely with dense medium punctation, interspaces shiny and narrower than puncture diameter; mesal area of S2 without carina, S2 without felt line. Pygidium with pygidial plate entirely smooth, except lateral and posterior margin finely punctured; posterior margin of hypopygium shallowly concave, mesal area with longitudinal depression > 0.5 X length of sternum. Genitalia as in fig. 56.

REDESCRIPTION

MALE: Length 8.05 (5.16-11.11, mean 8.99) mm. Body and appendages entirely golden yellow to pale yellowish-brown, except for darker mandibular apices and dark yellowish-brown ventral tooth; forewing lightly infuscated posterior to marginal cell; entire body covered in pallid setae.

Head 1.54 (1.47-1.71, mean 1.56) X as wide as long, 1.02 (0.94-1.07, mean 0.97) X as wide as mesosoma, 1.63 (1.46-1.69, mean 1.58) X as wide as vertex, 1.43 (1.31-1.54, mean 1.40) X as long as compound eye, sides behind compound eyes strongly convergent posteriorly and merging with weakly convex posterior margin. Frons with sparse fine punctation, interspaces shiny and wider than puncture diameter; foveola shallow; surface between median ocellus and foveola smooth, slightly longitudinally depressed, between toruli longitudinal median groove subrounded in section and shallow; scrobal carina absent; antennal tubercle simple, with sparse fine punctation. Vertex 0.67 (0.58-0.75, mean 0.66) X as long as wide, 1.46 (1.22-1.54, mean 1.37) X as wide as frons; posterior to lateral ocellus with sparse fine punctation, interspaces shiny and subequal to puncture diameter. Compound eye with ommatidia distinct. Ocelli large, convex and broadly oval, median ocellus 0.86 (0.78-0.93, mean 0.86) X as long as wide, interocellar distance 1.79 (1.22-1.87, mean 1.54) X ocellocular distance. Gena with dense coarse punctation, sometimes with punctures decreasing in density and size posteriorly, interspaces shiny. Clypeus 0.47 (0.40-0.49, mean 0.44) X as high as wide, free border with mesal area slightly protruding in a rounded arch, arch not upwardly flexed; central portion raised and slightly convex, with sparse fine punctation, interspaces > 2 X puncture diameter; vestiture length longer than height of clypeus. Mandible higher than thick, dorsal rim with carina along entire length, ending at base of inner tooth; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth adjacent, inner tooth subrounded; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 0.79 (0.79-0.93, mean 0.85) X height at base. Antenna with scape 2.29 (2.00-2.92, mean 2.39) X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere simple; second flagellomere 1.69 (1.66-2.04, mean 2.00) X length of first, 1.03 (0.93-1.12, mean 1.00) X length of third.

Mesosoma, excluding anterior collar, 1.61 (1.57-1.75, mean 1.66) X as long as wide. Pronotum 0.86 (0.84-0.93, mean 0.89) X as wide as mesosoma, anterodorsal surface mesally with dense ill-defined punctation, becoming pit-like shallow reticulations laterally, strongly convex, humeral angle subrounded, anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct and almost as large as a reticulation; posterior portion of lateral surface with sparse fine punctation, interspaces irregular and wider than puncture diameter, posterior margin impunctate. Mesoscutum 0.83 (0.73-0.85, mean 0.80) X as long as wide, 0.87 (0.84-0.90, mean 0.87) X as wide as pronotum; between notauli with moderate medium punctation, interspaces smooth and subequal to puncture diameter; laterally with sparse medium punctation, posterolaterally with dense, medium to coarse punctation; posterolateral corner raised as an angulate tooth. Scutellum subsquare, entire dorsal surface moderately to densely

covered with coarse subcircular punctation. Dorsellum with dense medium punctation, laterally simple. Propodeum with areola longer than neighbouring areae. Mesepisternum with dense coarse subcircular punctation, reticulations approximately same size as those on anterior portion of lateral surface of pronotum, scrobe small, almost indistinct, mesepisternal groove absent. Mesosternum with anterior concavity nearly impunctate, shiny, posteriorly with smooth to sparse fine punctation; anteromesal surface, on each side of midline, with two conical protuberances.

Forewing: Pterostigma 1.17 (0.99-1.52, mean 1.31) X length of anterior margin of marginal cell. Marginal cell 2.76 (2.22-3.22, mean 2.55) X as long as wide, 1.94 (1.58-2.37, mean 2.01) X length of second submarginal. Second submarginal cell petiolate anteriorly, 0.31 (0.17-0.35, mean 0.29) X length of discoidal cell. Third submarginal cell with anterior two-thirds of vein 3r-m nebulous, posterior one-third absent; medial vein absent; accessory vein nebulous, 1.4 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur simple with greatest width at midlength; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.74 (0.63-0.77, mean 0.68) X length of longer spur, longer spur almost straight; basitarsus straight. Hind leg: Coxa entirely with sparse punctation, interspaces wider than puncture diameter, mesal margin with longitudinal carina > 0.6 X length of coxa, ventral surface convex; trochanter simple; femur with macrosetae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae only on posterior surface with several setae anteriorly, shorter than shorter spur, shorter spur 0.71 (0.61-0.77, mean 0.71) X length of longer spur, longer spur almost straight, 0.73 (0.61-0.79, mean 0.70) X length of basitarsus; basitarsus with dense microsetae, macrosetae absent, ventral surface with three ill-defined rows of short stout spines. .

Metasoma 1.20 (1.20-1.91, mean 1.44) X as long as wide. First segment moderately broad, slightly constricted at apex, 2.41 (1.73-2.41, mean 2.17) X as long as wide, 2.67 (2.25-3.18, mean 2.67) X as long as high, 1.30 (0.90-1.30, mean 1.11) X as long as T2; tergum, except tergulum, irregular with moderate to dense, medium punctation, tergulum moderately and finely punctate anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum entirely with dense coarse punctation, median carina slightly irregular. T2 0.85 (0.83-0.98, mean 0.89) X as long as wide, 0.98 (0.93-1.03, mean 1.00) X as wide as mesosoma, vestiture sparse, anterior one-third with dense medium punctation, interspaces shiny and narrower than puncture diameter, posterior two-thirds with sparse fine punctation, felt line 0.40 (0.33-0.55, mean 0.45) X length of tergum, length anterior to felt line 1.16 (0.48-1.41, mean 0.88) X length of tergum posterior to felt line; S2 convex, setae evenly distributed and shorter than shorter mesotibial spur, anteriorly with moderate to dense, medium

punctation, interspaces irregular and narrower than puncture diameter, mesal area without carina, posteriorly with sparse to moderate, fine punctation, interspaces shiny and wider than puncture diameter, felt line absent. Pygidium transverse, posterior margin shallowly convex, anterior one-third with sparse punctation, interspaces smooth and wider than puncture diameter, pygidial plate entirely smooth, except lateral and posterior margin finely punctured; hypopygium with posterior margin shallowly concave, mesal area with slight longitudinal depression > 0.5 X length of sternum. Genitalia as in fig. 56.

FEMALE: Unknown.

MATERIAL EXAMINED

TYPE MATERIAL. Holotype: ♂, "D.S.W. Afrika [= Namibia] / Spitzkoppe [= Spitskop; 29°57'S 25°19'E] 9.1.[19]12 / Pueschel S.G."; "Type"; "*testacea* [*sic*] / Bisch*" (ZMHB).

MEASURED MATERIAL. 14♂: NAMIBIA: [3]Damaraland, Arandis, 6 km N, 22°22'S 14°59'E, 12.ii-11.iii.1985 (J. Irish & H. Rust, 62373) (1♂, SMWH); [5]Rehoboth, 23°18'S 17°03'E, 4.ii.1995 (P.S. Bayliss) light trap (1♂, DJBC); [10]Gobabeb, dune, 23°33'S 15°05'E, 25.xi.1978 (Wharton) at light (1♂, SMWH); [7]Namib/Naukluft Park, Kuiseb R. nr Gobabeb, 23°34'S 15°03'E, 18.ii-20.iii.1983 (Nat. Coll. Kuiseb Survey) (1♂, NCSA); [8]Maltahöhe District, Blässkrantz 7, 24°04'S 16°17'E, 25.v.1990 (J. Irish & E. Marais) (1♂, SMWH); [1]Maltahöhe distr., Sesriem Farm, 24°29'S 15°48'E, 19-20.i.1972 (Southern African Exp., B.M. 1972-1) general sweeping (1♂, NHML); [12]Mariental, 60 km S., 24°40'S 17°59'E, 2.ii.1995 (P.S. Bayliss) light trap (1♂, DJBC); [6]Namib-Expedition, 25°S 15°E, i.1977 (Holm, Kirsten & Scholtz) *det.* by Brothers as *T. lividus* André ♂ (1♂, UPSA); [4]Asab, 25°29'S 17°59'E, 1924 (J.S. Brown) (1♂, SAMC); [9]Lüderitz, Kanaän 104, 25°50'S 16°09'E, 6-7.x.1972 (H9419) (1♂, SMWH); [11, 13]Tses, 25°58'S 18°08'E, 1924, (J.S. Brown) (2♂, SAMC); [14]Karasburg Distr., Velloorsdrift 93, 28°45'S 19°15'E, 7-8.xi.1992 (E. Marais) (1♂, SMWH). SOUTH AFRICA: [7]Kalahari Gemsbok Park, Twee Rivieren, 26°27'S 20°34'E, 29.i-4.ii.1972 (M.W. Mansell) (1♂, DJBC).

ADDITIONAL MATERIAL. 56♂: NAMIBIA: Brandberg, Tsisab Valley, 21°01'S 14°41'E, 24.i.1981 (1♂, UPSA); Kalkfontein, 22°08'S 20°53'E, ii.1923 (J.S. Brown) (2♂, SAMC), iii.1923 (J.S. Brown) (1♂, SAMC), iv.1923, (J.S. Brown) *det.* as *T. lividus* Andr (1♂, SAMC), iv.1923 (J.S. Brown) (1♂, SAMC), ix.1923 (J.S. Brown) (2♂, SAMC), x.1923 (J.S. Brown) (2♂, SAMC), xi.1923 (J.S. Brown) (2♂, SAMC); Damaraland, Arandis, 6 km N., 22°22'S 14°59'E, 15.I-12.ii.1985 (J. Irish & H. Liessner, H61071) (1♂, SMWH); Kuiseb River, 23°07'S 14°30'E, 5.vii.1975, *det.* by Brothers as *T. lividus* André ♂ (1♂, UPSA); Windhoek District, Christirina 259, Nouas, 23°25'S 18°03'E, 21.xi.1989 (C.S. Roberts)

(1♂, SMWH); Gobabeb, 408 m, 23°33'S 15°05'E (1♂, TMSA); Gobabeb, 10 m. S., 23°33'S 15°05'E, iii.1968 (E. Holm) (1♂, TMSA); Namib/Naukluft Park, Kuiseb R. nr Gobabeb, 23°34'S 15°03'E, 18.ii-20.iii.1983 (Nat. Coll. Kuiseb Survey) (15♂, NCSA); Maltahöhe District, Blässkrantz 7, 24°04'S 16°17'E, 25.v.1990 (J. Irish & E. Marais) (1♂, SMWH); Maltahöhe, Sesriem 137, 24°29'S 15°48'E, 5-8.iv.1972 (H7431) (1♂, SMWH); (19) Sesriem Canyon, 3 mls. W. Sesriem, 24°31'S 15°46'E, 21-22.i.1972 (Southern African Exp., B.M. 1972-1) general sweeping (2♂, NHML); Mariental, 60 km S., 24°40'S 17°59'E, 2.ii.1995 (P.S. Bayliss) light trap (4♂, DJBC); Lüderitz, Gorasis 99, 25°18'S 15°56'E, 12-15.ii.1973 (H11596) (1♂, SMWH); Asab, 25°29'S 17°59'E, 1924 (J.S. Brown) *det.* as *T. lividus* Andr ♂ (1♂, SAMC), 1924 (J.S. Brown) (1♂, SAMC); Elephant Valley, 25°41'S 15°22'E, 7.i.1981 (Pretorius) mid morning, found dead in camp (1♂, SMWH); Lüderitz, Kanaän 104, 25°50'S 16°09'E, 6-7.x.1972 (H9419) (1♂, SMWH); Lüderitz, Kanaän 104, 25°53'S 16°07'E, 15-21.x.1976 (S. Louw & M-L. Penrith, H33331) (1♂, SMWH); Tses, 25°58'S 18°08'E, 1924 (J.S. Brown) *det.* as *T. lividus* Andr ♂ (1♂, SAMC), 1924 (J.S. Brown) (6♂, SAMC). SOUTH AFRICA: Mata Mata, 25°45'S 20°00'E, 7.ix.1985 (W.E. Ferguson) (2♂, DJBC).

DISTRIBUTION

This species occurs along the west coast of southern Africa, with specimens recorded from Namibia and the northwesternmost region of South Africa (fig. 73).

DISCUSSION

Bischoff (1920) described this species from a single male, caught by S. Pueschell at Spitskop. Although Bischoff (1920) believed this species to be closely related to *T. lividus*, he described it as a separate species, separating the two species by colour, shape of T1, and sculpturing on T1 and T2. The description, although an accurate description of the holotype, does not account for intraspecific variation, particularly in colour and sculpturing.

Suárez (1963, 1990) made reference twice to *T. testaceus*. While discussing *T. patrizii* (*T. patrizii* is determined here to be a junior synonym of *T. pallidicornis*), he briefly mentioned the similarity in morphology between *T. patrizii*, *T. lividus*, *T. chloroticus* and *T. testaceus*, stating that these four species are identical, and can only be separated from each other by colour (Suárez 1963). It is obvious that Suárez did not study any of the southern African species, but based this assumption on Bischoff's (1920) description. *Tricholabiodes patrizii* and *T. testaceus* are identical in coloration but each has its own unique complement and combination of characters, making them easily identifiable. Suárez (1990) included *T. testaceus* in a catalogue of virtually all described species of the genus.

During the course of this study much material of this species, from numerous localities, was studied and the species found to be widely distributed and the extent of its sculpturing, particularly on T2, variable. *Tricholabiodes testaceus* is most similar to *T. acer* from which it differs mainly in the shape of the posterior margin of the head and setae arrangement on S3-S6. In *T. testaceus*, the head has sides behind the compound eyes strongly convergent posteriorly, while S3-S6 has setae decumbent. In *T. acer*, the head has sides behind the compound eyes slightly convergent posteriorly, while S3-S6 has several ventrally directed setae.

***Tricholabiodes inornatus* sp. nov. ♂**

DIAGNOSIS

MALE: Body and appendages entirely golden yellow to medium yellowish brown, except for darker mandibular apices and pale yellowish-brown ventral tooth. Head with sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Free border of clypeus with mesal area slightly protruding in a weak subrounded arch, arch not upwardly flexed. Middle and inner mandibular teeth adjacent. Mesepisternum with scrobe and mesepisternal groove absent. Mesosternum with anteromesal surface, on each side of midline, with two conical protuberances. Forewing with 2nd submarginal cell anteriorly acute and barely reaching marginal cell although not petiolate. Mesal margin of metacoxa with longitudinal carina > 0.6 X length of coxa. Metasoma with T2 entirely with sparse to moderate and fine to medium punctation; anterior mesal area of S2 without carina, S2 without felt line. S3-S6 with subequal amounts of decumbent and erect setae, setae shorter than smaller mesotibial spur. Pygidium with pygidial plate densely and finely punctate, except anterolateral margin smooth; posterior margin of hypopygium shallowly concave. Genitalia as in fig. 57.

DESCRIPTION

MALE: Length 10.62 (6.98-11.68, mean 9.91) mm. Body and appendages entirely golden yellow to medium yellowish-brown, except for darker mandibular apices and dark yellowish-brown ventral tooth; forewing lightly infuscated posterior to marginal cell; entire body covered in long, pallid setae.

Head 1.44 (1.42-1.45, mean 1.45) X as wide as long, 0.84 (0.84-1.11, mean 0.96) X as wide as mesosoma, 1.46 (1.44-1.68, mean 1.54) X as wide as vertex, 1.50 (1.49-1.69, mean 1.60) X as long as compound eye, sides behind compound eyes slightly convergent posteriorly and gradually merging with

weakly convex posterior margin. Frons with sparse to moderate, fine punctation, interspaces shiny and wider than puncture diameter; foveola shallow; surface between median ocellus and foveola smooth, between toruli longitudinal median groove v-shape in section and deep; scrobal carina absent; antennal tubercle simple, with sparse fine punctation. Vertex 0.71 (0.53-0.78, mean 0.67) X as long as wide, 1.41 (1.18-1.41, mean 1.29) X as wide as frons; posterior to lateral ocellus with moderate fine punctation, interspaces shiny and subequal to puncture diameter. Compound eye with ommatidia indistinct. Ocelli large, convex and broadly oval, median ocellus 0.89 (0.82-0.93, mean 0.87) X as long as wide, interocellar distance 1.48 (1.19-1.48, mean 1.38) X ocellocular distance. Gena with sparse medium ill-defined punctation, interspaces irregular. Clypeus 0.37 (0.33-0.37, mean 0.36) X as high as wide, free border with mesal area slightly protruding in a weak subrounded arch, arch not upwardly flexed; central portion raised, with slight oval mesal depression, depression subrounded in section, with sparse fine punctation, interspaces > 2 X puncture diameter; vestiture length longer than height of clypeus. Mandible higher than thick, dorsal rim with carina along entire length, ending at base of inner tooth; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth adjacent, inner tooth subrounded; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely subrounded, mandibular height across ventral tooth 0.85 (0.82-0.90, mean 0.86) X height at base. Antenna with scape 2.06 (1.84-2.27, mean 2.02) X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere simple; second flagellomere 1.73 (1.30-1.82, mean 1.55) X length of first, 0.98 (0.94-1.12, mean 1.03) X length of third.

Mesosoma, excluding anterior collar, 1.68 (1.68-2.02, mean 1.77) X as long as wide. Pronotum 0.90 (0.87-0.97, mean 0.92) X as wide as mesosoma, anterodorsal surface mesally with dense ill-defined punctation, becoming pit-like shallow reticulations laterally, strongly convex, humeral angle subrounded; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct and almost as large as a reticulation; posterior portion of lateral surface with sparse fine punctation, interspaces irregular and wider than puncture diameter, posterior margin impunctate. Mesoscutum 0.83 (0.77-0.84, mean 0.80) X as long as wide, 0.86 (0.81-0.94, mean 0.88) X as wide as pronotum; between notauli with moderate medium punctation, interspaces smooth and subequal to puncture diameter; laterally with sparse to moderate medium punctation, posterolatally with dense, medium to coarse punctation; posterolateral corner raised as an angulate tooth. Scutellum subsquare, entire dorsal surface densely covered with coarse subcircular punctation. Dorsellum with dense coarse punctation, laterally simple. Propodeum with areola longer than neighbouring areae. Mesepisternum with pit-like, shallow reticulations, reticulations approximately same size as those on anterior portion of lateral surface of pronotum, scrobe and mesepisternal groove absent. Mesosternum with anterior concavity nearly

impunctate, shiny, posteriorly smooth to sparsely and finely punctate; anteromesal surface, on each side of midline, with two conical protuberances.

Forewing: Pterostigma 1.52 (1.38-2.16, mean 1.74) X length of anterior margin of marginal cell. Marginal cell 2.04 (2.02-2.61, mean 2.33) X as long as wide, 1.37 (1.32-1.93, mean 1.60) X length of second submarginal. Second submarginal cell anteriorly acute and barely reaching marginal cell although not petiolate, 0.37 (0.25-0.37, mean 0.32) X length of discoidal cell. Third submarginal cell with anterior two-thirds of vein 3r-m nebulous, posterior one-third spectral; medial vein spectral; accessory vein nebulous, 1.35 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur simple with greatest width at midlength; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.76 (0.72-0.79, mean 0.75) X length of longer spur, longer spur almost straight; basitarsus straight. Hind leg: Coxa entirely with sparse punctation, interspaces wider than puncture diameter, mesal margin with longitudinal carina > 0.6 X length of coxa, ventral surface convex; trochanter simple; femur with macrosetae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae sparsely but evenly distributed, shorter than shorter spur, shorter spur 0.64 (0.63-0.79, mean 0.70) X length of longer spur, longer spur almost straight, 0.65 (0.64-0.70, mean 0.66) X length of basitarsus; basitarsus with dense microsetae, macrosetae only on posterior margin and shorter than those on tibia, ventral surface with a row of short spines.

Metasoma 1.08 (1.08-1.54, mean 1.43) X as long as wide. First segment moderately broad, slightly constricted at apex, 1.89 (1.77-2.12, mean 1.89) X as long as wide, 2.38 (2.18-2.61, mean 2.39) X as long as high, 1.07 (1.02-1.09, mean 1.07) X as long as T2; tergum, except tergulum, with dense coarse subcircular punctation, tergulum with moderate fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum with dense coarse ill-defined punctation, median carina absent. T2 0.79 (0.79-0.86, mean 0.84) X as long as wide, 1.05 (1.00-1.05, mean 1.02) X as wide as mesosoma, vestiture sparse, subdecumbent to suberect, entirely with sparse to moderate and fine to medium punctation, interspaces shiny and subequal to puncture diameter, felt line 0.61 (0.57-0.63, mean 0.59) X length of tergum, length anterior to felt line 0.70 (0.57-0.88, mean 0.65) X length of tergum posterior to felt line; S2 convex, setae evenly distributed and shorter than shorter mesotibial spur, anterior half with moderate to dense, medium punctation, interspaces irregular and narrower than puncture diameter, mesal area without carina, posterior half with sparse, fine to medium punctation, interspaces shiny and subequal to puncture diameter, felt line absent. S3-S6 with

subequal amounts of decumbent and erect setae, setae shorter than smaller mesotibial spur. Pygidium transverse with posterior margin strongly convex, anterior one-third sparsely punctate, interspaces smooth and wider than puncture diameter, pygidial plate entirely with dense fine punctation, except anterolateral margin smooth; hypopygium with posterior margin shallowly concave, mesal area simple. Genitalia as in fig. 57.

FEMALE: Unknown.

MATERIAL EXAMINED

TYPE MATERIAL. Holotype: ♂, "Mucungo [14°03'S 18°30'E], / Angola. / Alt. 950 ft. / Oct.[ober] 1930."; "Mossamedes [= Mocámedes] / District."; "Carn.[egie] Mus.[eum] / Acc. 8994" (ICCM).

Measured paratypes: 6♂: ANGOLA: [2]Mocámedes, 24 mi. N.E., 400 m, 15°10'S 12°09'E, 12.xii.1966 (E.S. Ross & K. Lorenzen) (1♂, SMWH); [3]Mocámedes, Rio Bero, 15°10'S 12°09'E, 11.v.1974 (H19332) (1♂, SMWH). NAMIBIA: [6]Otjinhungwa, 17°16'S 12°26'E, 17-22.xi.1970 (H2567) (1♂, SMWH); [1]Kaokoland, Hartmannberge, W. at 17°26'S 12°17'E, 18.viii.1973 (H13563) (1♂, SMWH); [4, 5]Omatjenguma, 8 km NE, 17°58'S 12°21'E, 22-25.xi.1970 (H2565) (2♂, SMWH).

Additional paratypes: 44♂: ANGOLA: Mocámedes District, Mucungo, alt. 950 ft., 14°03'S 18°30'E, x.1930 (Carn. Mus., Acc. 8994) (1♂, ICCM), 20.x.1930 (Carn. Mus., Acc. 8994) (3♂, ICCM), 25.x.1930 (Carn. Mus., Acc. 8994) (2♂, ICCM); Huila, Sá da Bandeira, 15°04'S 13°33'E, 6-8.v.1974 (H18740) (1♂, SMWH); Mocámedes, 24 mi. N.E., 400 m, 15°10'S 12°09'E, 12.xii.1966 (E.S. Ross & K. Lorenzen) (1♂, CASC); Mocámedes (A13), 25 mls. S., 15°10'S 12°09'E, 27.ii.1972 (Southern African Exp., B.M. 1972-1) (1♂, NHML); Mocámedes, Pastoril do Sul, 15°10'S 12°09'E, 8-10.v.1974 (H18813) (7♂, SMWH), 20-22.xi.1974 (H23151) (3♂, SMWH); Mocámedes, Pedras Aguas, 15°10'S 12°09'E, 9.v.1974 (H19051) (1♂, SMWH); Mocámedes, Rio Bero, 15°10'S 12°09'E, 11.v.1974 (H19332) (1♂, SMWH); Maluila, 15°37'S 13°07'E, 22-23.xi.1974 (H23316) (14♂, SMWH). NAMIBIA: Omatjenguma, 8 km NE, 17°58'S 12°21'E, 22-25.xi.1970 (H2565) (5♂, SMWH); Kaokoland, Orupembe, 18°13'S 12°35'E, 16-17.viii.1973 (13503) (2♂, SMWH); Sanitatas, 18°18'S 12°51'E, 25-26.xi.1970 (H2566) (1♂, SMWH); Damaraland, Messum Mts, 21°23'S 14°13'E, 15-18.iv.1976 (H32611) (1♂, SMWH).

DISTRIBUTION

This species occurs along the west coast of southern Africa, with specimens recorded from southern Angola and northern Namibia (fig. 73).

DISCUSSION

This species is most similar to *T. lividus*. These two species can be separated by the shape of the anterodorsal margin of the pronotum, the presence of macrosetae on the metabasitarsus and the genitalia (figs 57 & 58), in particular the shape of the parameres. In *T. inornatus*, the anterodorsal margin of the pronotum is strongly convex and the metabasitarsus has macrosetae only on the posterior margin. In *T. lividus*, the anterodorsal margin of the pronotum is slightly convex and the metabasitarsus is without macrosetae.

ETYMOLOGY

"*inornatus*" (L.), unadorned; in reference to the simplicity in characters shown.

***Tricholabiodes lividus* André, 1909. ♂ & ♀**

Tricholabiodes livida [*sic*] André, 1909a:122. ♂

Tricholabiodes livida [*sic*] André, 1909b:72. ♂

[*Tricholabioides* [*sic*]] *livida* [*sic*] André; Bischoff, 1920:102, 103. ♂

[*Tricholabioides* [*sic*]] *livida* [*sic*] André; Suárez, 1963:924. ♂

[*Tricholabioides* [*sic*]] *livida* [*sic*] André; Suárez, 1990:186. ♂

Tricholabiodes livida [*sic*] André; Bayliss & Brothers, 1996:250. ♀ ♂

DIAGNOSIS

MALE: Body and appendages entirely golden yellow to medium yellowish-brown, except for darker mandibular apices and dark yellowish-brown ventral tooth. Head with sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with scrobal carina slight, arcuate, not reaching scrobal tubercle. Free border of clypeus with mesal area strongly protruding in a slightly upwardly flexed arch. Middle and inner mandibular teeth adjacent. Mesepisternum with scrobe indistinct, mesepisternal groove absent. Mesosternum with anteromesal surface, on each side of midline, with two conical protuberances. Forewing with 2nd submarginal cell anteriorly acute and barely reaching marginal cell, sometimes petiolate. Mesal margin of metacoxa with slight but sometimes indistinct, longitudinal carina > 0.6 X length of coxa. Metasoma with T2 entirely with sparse fine punctation, anterior one-third with interspaces 2 X puncture diameter, posterior two-thirds with interspaces 3-4 X puncture diameter; anterior mesal area of S2 without carina, S2 without felt line. Pygidium with pygidial plate entirely smooth, except lateral and posterior margin finely

punctured; hypopygium with posterior margin shallowly concave. Genitalia as in fig. 58.

REDESCRIPTION

MALE: Length 9.71 (6.14-14.65, mean 10.33) mm. Body and appendages entirely golden yellow to medium yellowish-brown, except for darker mandibular apices and dark yellowish-brown ventral tooth; forewing lightly infuscated posterior to marginal cell; entire body covered in pallid setae.

Head 1.46 (1.36-1.60, mean 1.49) X as wide as long, 0.95 (0.88-1.13, mean 0.98) X as wide as mesosoma, 1.55 (1.45-1.63, mean 1.55) X as wide as vertex, 1.45 (1.38-1.69, mean 1.51) X as long as compound eye, sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with sparse fine punctation, interspaces shiny and wider than puncture diameter; foveola shallow; surface between median ocellus and foveola smooth, without longitudinal median groove, between toruli longitudinal median groove subrounded in section and shallow; scrobal carina slight, arcuate, not reaching scrobal tubercle but sometimes indistinct; antennal tubercle simple, irregular, shiny, sparsely and finely punctate. Vertex 0.68 (0.68-0.80, mean 0.74) X as long as wide, 1.37 (1.20-1.59, mean 1.44) X as wide as frons; posterior to lateral ocellus with moderate fine punctation, interspaces shiny and subequal to puncture diameter. Compound eye with ommatidia indistinct. Ocelli large, convex and broadly oval, median ocellus 0.81 (0.81-1.11, mean 1.01) X as long as wide, interocellar distance 1.40 (1.05-1.75, mean 1.29) X ocellocular distance. Gena with moderate medium punctation, interspaces shiny. Clypeus 0.40 (0.37-0.47, mean 0.42) X as high as wide, free border with mesal area strongly protruding in a slightly upwardly flexed arch; central portion raised, convex, with sparse fine punctation, interspaces 3 X puncture diameter; vestiture length longer than height of clypeus. Mandible higher than thick, dorsal rim with carina along entire length, ending at base of inner tooth; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth adjacent, inner tooth subrounded; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 0.82 (0.81-1.04, mean 0.89) X height at base. Antenna with scape 2.11 (1.82-2.42, mean 2.12) X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere simple; second flagellomere 1.68 (1.55-1.95, mean 1.73) X length of first, 1.03 (0.97-1.20, mean 1.07) X length of third.

Mesosoma, excluding anterior collar, 1.75 (1.64-2.08, mean 1.90) X as long as wide. Pronotum 0.87 (0.82-1.08, mean 0.96) X as wide as mesosoma, anterodorsal surface with dense ill-defined punctation becoming pit-like shallow reticulations laterally, slightly convex, humeral angle subrounded; anterior

portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct and almost as large as a reticulation; posterior portion of lateral surface with sparse fine punctation, interspaces irregular and wider than puncture diameter, posterior margin impunctate. Mesoscutum 0.78 (0.76-0.85, mean 0.79) X as long as wide, 0.90 (0.80-0.94, mean 0.87) X as wide as pronotum; between notauli with sparse, fine to medium punctation, interspaces smooth and wider than puncture diameter; laterally with sparse fine punctation, posterolaterally with dense coarse punctation; posterolateral corner raised as an angulate tooth. Scutellum subsquare, entire dorsal surface moderately to densely covered with coarse punctation. Dorsellum with dense medium punctation, laterally simple, although edges of lateral punctures may give the impression that dorsellum is laterally ridged. Propodeum with areola longer than neighbouring areae. Mesepisternum with pit-like, shallow reticulations, reticulations approximately same size as those on anterior portion of lateral surface of pronotum, scrobe indistinct, mesepisternal groove absent. Mesosternum with anterior concavity nearly impunctate, shiny, posteriorly with sparse fine punctation; anteromesal surface, on each side of midline, with two conical protuberances.

Forewing: Pterostigma 1.08 (0.84-1.20, mean 1.03) X length of anterior margin of marginal cell. Marginal cell 2.64 (2.45-2.78, mean 2.51) X as long as wide, 1.89 (1.39-1.89, mean 1.65) X length of second submarginal. Second submarginal cell anteriorly acute and barely reaching marginal cell, sometimes petiolate, 0.30 (0.29-0.40, mean 0.31) X length of discoidal cell. Third submarginal cell with vein 3r-m tubular anterior to junction with accessory vein, nebulous becoming spectral posterior to junction with accessory vein; medial vein absent; accessory vein nebulous, 1.35 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur simple with greatest width at midlength; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.73 (0.50-0.77, mean 0.63) X length of longer spur, longer spur almost straight; basitarsus straight. Hind leg: Coxa entirely with moderate medium punctation, interspaces subequal to puncture diameter, mesal margin with slight but sometimes indistinct, longitudinal carina > 0.6 X length of coxa, ventral surface convex; trochanter simple; femur with macrosetae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae mostly on posterior surface with several setae anteriorly, shorter than shorter spur, shorter spur 0.75 (0.62-0.93, mean 0.74) X length of longer spur, longer spur almost straight, 0.62 (0.59-0.81, mean 0.67) X length of basitarsus; basitarsus with dense microsetae, macrosetae absent, ventral surface with three ill-defined rows of short spines.

Metasoma 1.47 (1.03-1.47, mean 1.27) X as long as wide. First segment broad, short, slightly

constricted at apex 2.00 (1.62-2.09, mean 1.70) X as long as wide, 2.50 (1.95-2.64, mean 2.07) X as long as high, 1.00 (0.83-1.00, mean 0.94) X as long as T2; tergum, except tergulum, with dense coarse subcircular punctation, tergulum with moderate fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum with dense coarse, often ill-defined, punctation, median carina continuous. T2 0.96 (0.85-0.99, mean 0.90) X as long as wide, 0.99 (0.97-1.34, mean 1.24) X as wide as mesosoma, vestiture subdecumbent to suberect, entirely with sparse fine punctation, anteriorly interspaces 2 X puncture diameter, posteriorly interspaces 3-4 X puncture diameter, felt line 0.50 (0.40-0.52, mean 0.40) X length of tergum, length anterior to felt line 0.85 (0.78-1.35, mean 1.02) X length of tergum posterior to felt line; S2 convex, setae evenly distributed and shorter than shorter mesotibial spur, anteriorly with moderate medium punctation, interspaces subequal to puncture diameter, mesal area without carina, posteriorly with sparse fine punctation, interspaces shiny wider than puncture diameter, felt line absent. Pygidium transverse, posterior margin strongly convex, anterior one-third with moderate dense punctation, interspaces smooth and subequal to puncture diameter, pygidial plate entirely smooth, except lateral and posterior margin finely punctured; hypopygium with posterior margin shallowly concave, mesal area simple. Genitalia as in fig. 58.

FEMALE: Undescribed but briefly discussed by Bayliss & Brothers (1996).

MATERIAL EXAMINED

TYPE MATERIAL. Holotype: ♂, "D.S.W.-Afrika [= Namibia] / Rooibank [23°11'S 14°39'E] / v.[19]05 / L. Schultze S."; "*Tricholabiodes* / *livida* [*sic*] ♂ André"; "TYPE"; "MUSEUM PARIS / COLLECTION / ERNEST ANDRÉ / 1914" (SAMC).

MEASURED MATERIAL. 16♂ : NAMIBIA: [6,12]Helmeringhausen, 25°54'S 16°51'E, 5.iii.1987 (R. Oberprieler) light trap (2♂, NCSA); [2]Diamond Area no. 1, Klinghardtberge, 27°19'S 15°46'E, 20/21.x.1974 (M.W. Mansell) (1♂, NCSA); [1, 3, 8, 16]Namaskluft, Rosh Pinah, 27°57'S 16°46'E, 14.xi.1975 (V.B. Whitehead) to light (4♂, SAMC). SOUTH AFRICA: [4, 5, 10]Kalahari Gemsbok NP, Nossob Camp, 900 m 25°25'S 20°36'E, 31.x-2.xi.1990 (M.W. Mansell) (3♂, NCSA); [13, 14]Barby Farm 13, 25 mls. W. Helmeringhausen, 25°51'S 16°33'E, 17-18.i.1972 (Southern African Exp., B.M. 1972-1) (2♂, NHML); [15]Kalahari Gemsbok Nat. Park, Twee Rivieren, 26°25'S 20°37'E, 13.ii.1988 (G.D. Butler) (1♂, NCSA), [7]9.iv.1988 (C. Scholtz) (1♂, NCSA); [11]Auob-Nossob Junct., 26°26'S 20°37'E, iv.1933 (G. van Son) *det.* as *T. lividus* André (1♂, TMSA); [9]Boksputs Farm, 20 km N of Keimoes, 28°35'S 20°54'E, 5.ii.1979 (B. Lamoral, NC 79-7) kalahari sand substratum (1♂, DJBC).

ADDITIONAL MATERIAL. 190♂: ANGOLA: (A15) Mocámedes, 10 mls NE, 15°10'S 12°09'E, 27-29.ii.1972 (R. Giraul) (1♂, NHML). NAMIBIA: Otjinhungwa, 17°16'S 12°26'E, 17-22.xi.1970 (H2567) (2♂, SMWH); Sanitatas, 18°18'S 12°51'E, 25-26.xi.1970 (H2566) (1♂, SMWH); Kalkfontein, 22°08'S 20°53'E, iv.1923 (J.S. Brown) *det.* as *T. lividus* André (1♂, SAMC), iv.1923 (J.S. Brown) (1♂, SAMC), x.1923 (J.S. Brown) (1♂, SAMC); Windhoek, 22°34'S 17°06'E (H. Kinges) (1♂, TMSA); Windhoek Caravan Park, 22°34'S 17°06'E, 5-6.ii.1995 (P.S. Bayliss) light trap (2♂, DJBC); Windhoek, Richthofen 126, 22°34'S 17°45'E, 1-30.xi.1978 (S. Louw & M-L. Penrith, H44750) preservative traps (1♂, SMWH); Windhoek Dist., 110 km E. Windhoek, Arnhem Farm No. 222, 22°41'S 18°08'E, 25.x.1972 (C.L. Hogue) (2♂, UCRC); Rehoboth, 23°18'S 17°03'E, 4.ii.1995 (P.S. Bayliss) light trap (20♂, DJBC); Windhoek Distr., Eschenhof 261, 23°20'S 18°05'E, 21.xi.1989 (C.S. Roberts) (1♂, SMWH); Windhoek District, Christirina 259, Nouas, 23°25'S 18°03'E, 21.xi.1989 (C.S. Roberts) (3♂, SMWH); Windhoek, Arnhem 222, 23°27'S 18°32'E, 23-27.x.1972 (H9685) (1♂, SMWH); Namib-Naukluft Park, Gobabeb, along Kuiseb River, 23°33'S 15°02'E, 27.i.1995 (P.S. Bayliss) light trap (2♂, DJBC); Gobabeb, 23°33'S 15°05'E, 15-31.xii.1979 (R. Wharton) (2♂, DJBC); Gobabeb, Kuiseb R., 23°33'S 15°05'E, 6.i.1988 (C.D. Eardley) light trap (1♂, DJBC), 11.i.1988 (C.D. Eardley) light trap (1♂, DJBC), 16.ii.1988 (C.D. Eardley) light trap (1♂, SMWH); Gobabeb, 23°33'S 15°05'E, 10.i.1988 (C.D. Eardley) light trap (1♂, DJBC), 30.i.1988 (C.D. Eardley) light trap (1♂, DJBC), 7.ii.1988 (C.D. Eardley) light trap (1♂, DJBC), 10.ii.1988 (C.D. Eardley) light trap (1♂, DJBC), 12.ii.1988 (C.D. Eardley) light trap (1♂, DJBC), 18.ii.1988 (C.D. Eardley) light trap (2♂, DJBC), 20.ii.1988 (C.D. Eardley) light trap (1♂, DJBC), 22.ii.1988 (C.D. Eardley) light trap (2♂, DJBC), 23.ii.1988 (C.D. Eardley) light trap (2♂, DJBC), 27.ii.1988 (C.D. Eardley) light trap (3♂, DJBC); Namib/Naukluft Park, Kuiseb R. nr Gobabeb, 23°34'S 15°03'E, 18.ii.-20.iii.1983 (Nat. Coll. Kuiseb Survey) (2♂, NCSA); (23) Homeb, 10 mls. ESE. Gobabeb, 23°38'S 15°11'E, 23-25.i.1972 (Southern African Exp., B.M. 1972-1) (2♂, NHML); Gobabeb, 23°54'S 15°03'E, 23.i.1981 (Pretorius, I1170) station, night, attracted to artificial light (1♂, SMWH); Maltahöhe Dist., Blässkranz 7 at: 24°06'05"S 16°14'05"E, 12-14.x.1984 (J. Irish) (1♂, SMWH); Gibean, Kub, 24°14'S 17°30'E, 19.xi.1971 (H5151) (1♂, SMWH); Namib Desert Park, Sesriem Camp, 24°29'S 15°47'E, 4.iv.1986 (J. Irish, H65241) (1♂, SMWH); Maltahöhe, Sesriem 137, 24°29'S 15°48'E, 5-8.iv.1972 (H7431) (5♂, SMWH); (17) Maltahöhe distr., Sesriem Farm, 24°29'S 15°48'E, 19-20.i.1972 (Southern African Exp., B.M. 1972-1) (3♂, NHML); Maltahöhe Dist., Mooirivier, 24°39'S 16°15'E, 4.v.1969 (H.D. Brown) (1♂, NCSA); Mariental, 60 km S., 24°40'S 17°59'E, 2.ii.1995 (P.S. Bayliss) light trap (7♂, DJBC); (18) Sossusvlei, Diamond Area No. 2, 24°42'S 15°17'E, 20-21.i.1972 (2♂, NHML); Lüderitz, Gorasis 99, 25°18'S 15°56'E, 25-31.i.1974 (H16984) (2♂, SMWH); Maltahöhe Distr., Kronenhof 117, 25°29'S 16°27'E, 11.i.1990 (J. Irish & E. Marais) (1♂, SMWH); Keetmanshoop District, Mukorob 14, 25°30'S 18°10'E, 17/18.iv.1986 (J. Irish, H65502)

(3♂, SMWH); Diamond Area 2, Numabis Pan, 25°31'S 15°35'E, 7.iv.1986 (J. Irish, H65330) (2♂, SMWH); Huams Riv. Bed, 25°37'S 17°01'E, 31.i.1969 (B. Lamoral) (1♂, DJBC); Keetmanshoop Dist., 1 km W. Mata Mata, Welverdien Farm No. 328, 25°47'S 19°59'E, 12.x.1972 (C.L. Hogue) (2♂, UCRC), 18.x.1972 (C.L. Hogue) (1♂, UCRC), 19.x.1972 (C.L. Hogue) (1♂, UCRC); Lüderitz, Kanaän 104, 25°50'S 16°09'E, 6-7.x.1972 (H9419) (1♂, SMWH), 25.iv-2.v.1977 (M-L. Penrith & S. Louw, H34738) (1♂, SMWH); (13) Barby Farm, 25 mls. W. Helmeringhausen, 25°51'S 16°33'E, 17-18.i.1972 (Southern African Exp., B.M. 1972-1) (2♂, NHML); Helmeringhausen, 25°54'S 16°51'E, 5.iii.1987 (R. Oberprieler) light trap (5♂, NCSA); Helmeringhausen, 25°55'S 16°49'E, 17.ii.1988 (G.D. Butler) (1♂, NCSA); Keetmanshoop District, Khabus 146, 26°18'S 18°13'E, 8.xii.1988-6.i.1989 (N. & G. Olivier) preserv. traps, on sandy plain next to dry river bed (1♂, DJBC); Bethanien, Sandverhaar 80, 26°50'S 17°25'E, 21-22.x.1976 (S. Louw & M-L. Penrith, H33399) (5♂, SMWH); Seeheim, 26°50'S 17°45'E, 18.ix.1933 (G. van Son) *det.* by Invrea as *T. testaceus* Bisch. (1♂, TMSA); Keetmanshoop, Swartbaas West 276, 27°01'S 19°42'E, 19-22.iv.1972 (H7831) (1♂, SMWH); Bethanien Distr., Zaracheibis 107, 27°23'S 17°23'E, 22.xi.1992 (Huns Exp. '92) (1♂, SMWH); Bethanien District, Churietabis 108, 27°27'S 17°25'E, 22.xi.1992 (Huns Exp 92) (1♂, SMWH); Kuruman, 27°27'S 24°16'E, 3.i.1977 (Empey) (1♂, DJBC); Bethanien, Churutabis 108, 27°29'S 17°28'E, 4-12.x.1974 (H20969) (2♂, SMWH); Namaskluft, Rosh Pinah, 27°57'S 16°46'E, 14.xi.1975 (V.B. Whitehead) to light (4♂, SAMC); Lüderitz Distr., Boomrivier, 28°00'S 17°03'E, 11-12.xi.1992 (Huns Exp. 92) (1♂, SMWH); Lüderitz Distr., Boomrivier, 28°01'S 17°04'E, 13-26.xi.1992 (E. Marais) Pres. pitfall trap (1♂, SMWH); Karasburg District, Norachas 14, 28°02'S 18°06'E, 16/17.iv.1986 (J. Irish) (3♂, SMWH); Warmbad, Ortmansbaus 120, 28°18'S 18°42'E, 18-21.x.1971 (H4693) light at night (1♂, SMWH); (W1) Nr. Onseepkans, Orange R. Banks, 28°48'S 19°13'E, 8-10.i.1972 (Southern African Exp., B.M. 1972-1) (6♂, NHML). SOUTH AFRICA: Guskop, Orange River, 7.xii.1949 (Dr C. Koch) (1♂, TMSA); E-Y: 544, 14.i.1975 (Endrödy-Younga) at light (1♂, TMSA); Kalahari Gemsbok NP, Nossob Camp, 900 m, 25°25'S 20°36'E, 31.x-2.xi.1990 (M.W. Mansell) (3♂, NCSA); Kalahari Gemsbok Park, Nossob Camp, 25°30'S 20°24'E, 12-13.iii.1995 (P.S. Bayliss) iight trap (2♂, DJBC); Kalahari Gemsbok Park, 25°41'S 20°20'E, 18.xii.1970 (B.H. Veenemans) (3♂, NCSA); Kalahari Gemsbok Park, Twee Rivieren, 26°25'S 20°37'E, 29.i-4.ii.1972 (M.W. Mansell) (2♂, DJBC); Kalahari Gemsbok Nat. Park, Twee Rivieren, 26°25'S 20°37'E, 13.ii.1988 (G.D. Butler) (5♂, NCSA), 9.iv.1988 (C. Scholtz) (1♂, NCSA), 18-19.x.1989 (M.W. Mansell) (1♂, NCSA); Auob-Nossob Junct., 26°26'S 20°37'E, iv.1933 (G. van Son) *det.* by Invrea as *T. lividus* André (1♂, TMSA), iv.1933 (G. van Son) *det.* as *T. lividus* André (4♂, TMSA); Richtersveld, Numees Mine, 28°18'S 16°58'E, 16-20.ii.1979 (Lamoral, Bampton & Barnley) (2♂, DJBC); Richtersveld National Park, Potjiespram, 28°18'S 16°58'E, 29.i.1995 (P.S. Bayliss) light trap (10♂, DJBC); Upington, 28°28'S 21°14'E, i.1919 (Fath R. Solier) (2♂, SAMC);

Alexander Bay, 28°35'S 16°29'E, 9.xii.1948 (Koch & Van Son) (2♂, TMSA); Boksputs Farm, 20 km N of Keimoes, 28°35'S 20°54'E, 5.ii.1979 (B. Lamoral, NC 79-7) kalahari sand substratum (2♂, DJBC); Vioolsdrif, 28°50'S 17°39'E, 14-18.xii.1970 (Potgieter & Snyman) (1♂, TMSA); Henkries Valley, 28°57'S 18°07'E, 11.x.1980 (Whitehead) (1♂, SAMC); Jackalswater, 29°49'S 22°33'E, x.1911 (Lightfoot) *det.* by A.J.H. as *T. lividus* André (4♂, SAMC); Jackalswater, 29°49'S 22°33'E, vi.1938 (P. Smithers) (1♂, SAMC); Beaufort West, 32°21'S 22°33'E, ii.1958 (2♂, SAMC); Sutherland, 32°24'S 20°40'E, 11.xii.1971 (E. Holm) (1♂, NCSA).

DISTRIBUTION

This species has a broad distribution in southern Africa, with specimens recorded from southern Angola, Namibia, and northern and western South Africa (fig. 74).

DISCUSSION

André (1909a, 1909b) described, accurately and in detail, this species from a single male, caught by L. Schultze at Rooibank (Namibia). Bischoff (1920) redescribed this species from several specimens, including the holotype. Bischoff concluded that *T. lividus* is similar to *T. testaceus* and *T. thisbe*, but can be separated from these two species by colour and forewing venation. Bischoff's identification of *T. thisbe* is incorrect. In redescribing *T. thisbe* Bischoff never studied the holotype but based his identification of *T. thisbe* on Péringuey's description.

Suárez (1963, 1990) made reference twice to *T. lividus*. While discussing *T. patrizii* (*T. patrizii* is determined here as a junior synonym of *T. pallidicornis*) Suárez (1963) briefly mentioned the similarity in morphology between *T. patrizii*, *T. lividus*, *T. chloroticus* and *T. testaceus*, stating that these four species are identical and can only be separated from each other by coloration. As previously discussed, it is obvious that Suárez did not study any of the southern African species, but based his assumption for separating these four species partly on André (1909a, 1909b) and Bischoff (1920). All four species are almost identical in coloration and cannot be separated using this character. Alternately, each species has its own unique combination of characters. Suárez (1990) included *T. lividus* in a catalogue of virtually all described species of the genus.

During the course of this study much material of this species, from numerous localities, was studied and the species found to be widely distributed with many characters showing a large degree of intraspecific variation. This species is most similar to *T. inornatus*. These two species can be separated by the shape of the anterodorsal margin of the pronotum, the presence of macrosetae on the metabasitarsus and the

genitalia (figs 57 & 58), in particular, the shape of the parameres. In *T. lividus*, the anterodorsal margin of the pronotum is slightly convex and the metabasitarsus is without macrosetae. In *T. inornatus*, the anterodorsal margin of the pronotum is strongly convex and the metabasitarsus has macrosetae only on the posterior margin.

***Tricholabiodes pallidior* Bischoff, 1920. ♂**

[*Tricholabioides* [*sic*]] *semele pallidior* Bischoff, 1920:103, 107. ♂
[*Tricholabioides* [*sic*]] *semistriateformis* [*sic*] *pallidior* Bischoff; Suárez, 1990:187. ♂

DIAGNOSIS

MALE: Metasoma with T1 entirely medium yellowish-brown, T2-T6 medium reddish-brown, becoming paler posteriorly, sterna paler than corresponding terga. Head with sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with median longitudinal groove absent, scrobal carina absent. Free border of clypeus with mesal area slightly protruding in a rounded arch, arch not upwardly flexed. Middle and inner mandibular teeth adjacent. Dorsellum laterally ridged. Mesosternum with anteromesal surface, on each side of midline, with two conical protuberances. Forewing with 2nd submarginal cell petiolate anteriorly. Mesal margin of metacoxa simple. Metasoma with anterior one-third of T2 with moderate medium punctation, interspaces shiny and subequal to puncture diameter; anterior mesal area of S2 without carina, S2 without felt line. S3-S6 with subequal amounts of decumbent and erect setae, setae shorter than smaller mesotibial spur. Posterior margin of hypopygium shallowly concave, mesal area simple. Genitalia as in fig. 60.

REDESCRIPTION

MALE: Length 9.55 (8.54-12.26, mean 10.40) mm. Head, including clypeus and antenna, pale to medium yellowish-brown; mandible almost entirely pale yellowish-brown, apex black, ventral tooth pale reddish-black; mesosoma pale to medium yellowish-brown; legs, including coxae and tibial spurs, pale yellowish-brown; forewing lightly infuscated posterior to pterostigma; pterostigma and wing veins pale yellowish-brown; metasoma with T1 entirely medium yellowish-brown, T2-T6 medium reddish-black, becoming paler posteriorly, sterna paler than corresponding terga; entire body covered with pallid setae.

Head 1.38 (1.38-1.49, mean 1.44) X as wide as long, 0.93 (0.87-0.99, mean 0.92) X as wide as mesosoma, 1.50 (1.43-1.64, mean 1.51) X as wide as vertex, 1.60 (1.54-1.72, mean 1.61) X as long as

compound eye, sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with sparse fine punctation, interspaces shiny and wider than puncture diameter; foveola shallow; surface between median ocellus and foveola smooth, between toruli longitudinal median groove absent; scrobal carina absent; antennal tubercle simple, irregular, shiny, with sparse fine punctation. Vertex 0.72 (0.66-0.78, mean 0.72) X as long as wide, 1.36 (1.25-1.45, mean 1.36) X as wide as frons; posterior to lateral ocellus with sparse fine punctation, interspaces shiny and wider than puncture diameter. Compound eye with ommatidia indistinct. Ocelli large, convex and broadly oval, median ocellus 0.82 (0.82-1.12, mean 0.95) X as long as wide, interocellar distance 1.60 (1.08-1.60, mean 1.34) X ocellocular distance. Gena with sparse medium punctation, interspaces shiny. Clypeus 0.40 (0.32-0.40, mean 0.34) X as high as wide, free border with mesal area slightly protruding in a weak subrounded arch, arch not upwardly flexed; central portion slightly raised and convex, with sparse fine punctation, interspaces > 2 X puncture diameter; vestiture length longer than height of clypeus. Mandible higher than thick, dorsal rim with carina along entire length, ending at base of inner tooth; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth adjacent, inner tooth subrounded; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely subrounded, mandibular height across ventral tooth 0.79 (0.79-1.00, mean 0.88) X height at base. Antenna with scape 2.24 (1.90-2.39, mean 2.14) X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere simple; second flagellomere 1.67 (1.60-1.83, mean 1.70) X length of first, 1.06 (1.00-1.14, mean 1.05) X length of third.

Mesosoma, excluding anterior collar, 1.72 (1.48-1.76, mean 1.61) X as long as wide. Pronotum 0.90 (0.85-0.93, mean 0.90) X as wide as mesosoma, anterodorsal surface mesally with dense ill-defined punctation becoming pit-like shallow reticulations laterally, strongly convex, humeral angle subrounded; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct and almost as large as a reticulation; posterior portion of lateral surface with sparse fine punctation, interspaces irregular and wider than puncture diameter, posterior margin impunctate. Mesoscutum 0.76 (0.74-0.80, mean 0.76) X as long as wide, 0.90 (0.85-0.92, mean 0.88) X as wide as pronotum; between notauli with sparse medium punctation, interspaces smooth and wider than puncture diameter; laterally with sparse, fine to medium punctation, posterolaterally with dense coarse punctation; posterolateral corner raised as an angulate tooth. Scutellum subsquare, entire dorsal surface densely covered with coarse subcircular punctation. Dorsellum with dense medium punctation, laterally ridged. Propodeum with areola longer than neighbouring areae. Mesepisternum, anterior to scrobe with sparse fine punctation becoming shallow pit-like reticulations posteriorly, posterior to scrobe with pit-like, shallow

reticulations, reticulations approximately same size as those on anterior portion of lateral surface of pronotum, scrobe a distinct subcircular depression, mesepisternal groove absent. Mesosternum with anterior concavity nearly impunctate, shiny, posteriorly smooth; anteromesal surface, on each side of midline, with two conical protuberances.

Forewing: Pterostigma 1.16 (0.93-1.55, mean 1.17) X length of anterior margin of marginal cell. Marginal cell 2.62 (1.96-2.62, mean 2.23) X as long as wide, 1.89 (1.37-1.91, mean 1.65) X length of second submarginal. Second submarginal cell petiolate anteriorly, 0.26 (0.24-0.37, mean 0.29) X length of discoidal cell. Third submarginal cell with vein 3r-m tubular anterior to junction with accessory vein, nebulous becoming absent posterior to junction with accessory vein; medial vein spectral; accessory vein nebulous, 1.66 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur simple with greatest width at midlength; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.69 (0.69-0.82, mean 0.75) X length of longer spur, longer spur almost straight; basitarsus straight. Hind leg: Coxa entirely with sparse punctation, interspaces wider than puncture diameter, mesal margin simple, ventral surface convex; trochanter simple; femur with macrosetae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae sparsely but evenly distributed, shorter than shorter spur, shorter spur 0.64 (0.64-0.76, mean 0.71) X length of longer spur, longer spur almost straight, 0.60 (0.58-0.69, mean 0.64) X length of basitarsus; basitarsus with dense microsetae, macrosetae only on posterior margin and shorter than those on tibia, ventral surface with two to three rows of short spines.

Metasoma 1.30 (0.98-1.32, mean 1.18) X as long as wide. First segment broad and short, slightly constricted at apex, 1.90 (1.43-1.90, mean 1.71) X as long as wide, 2.53 (2.16-2.53, mean 2.26) X as long as high, 1.09 (0.97-1.09, mean 1.03) X as long as T2; tergum, except tergulum, irregular with sparse to moderate and fine to medium punctation, tergulum with moderate fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum anteriorly with sparse moderate punctation, punctures ill-defined, interspaces irregular, posteriorly with dense coarse punctation, median carina continuous. T2 0.99 (0.74-0.99, mean 0.81) X as long as wide, 1.00 (0.99-1.17, mean 1.05) X as wide as mesosoma, vestiture sparse, anterior one-third with moderate medium punctation, interspaces shiny and subequal to puncture diameter, posterior two-thirds shallowly and sparsely punctate, interspaces shiny and wider than puncture diameter, felt line 0.53 (0.41-0.53, mean 0.49) X length of tergum, length anterior to felt line 0.90 (0.66-0.90, mean 0.78) X length of tergum posterior to felt line; S2 convex, setae evenly distributed and shorter than shorter mesotibial spur,

entirely with moderate medium punctation, anteriorly interspaces irregular, posteriorly interspaces shiny, mesal area without carina, felt line absent. S3-S6 with subequal amounts of decumbent and erect setae, setae shorter than smaller mesotibial spur. Pygidium transverse with posterior margin strongly convex, anterior one-third with moderate dense punctation, interspaces smooth and subequal to puncture diameter, pygidial plate entirely smooth, except lateral and posterior margin finely punctured; hypopygium with posterior margin shallowly concave, mesal area simple. Genitalia as in fig. 60.

FEMALE: Unknown.

MATERIAL EXAMINED

TYPE MATERIAL. Holotype: ♂, "D.S.W.-Afika [= Namibia] / Walfischbai [= Walvis Bay; 22°59'S 14°31'E] / L. Schultze L."; "*semele* / *pallidior* / Bisch*"; "Type" (ZMHM).

MEASURED MATERIAL. 18♂: NAMIBIA: [6]Kaross, 19°30'S 14°20'E, ii.1925 (Mus. Exped.) (1♂, SMWH); [18]Omaruru, Eansiye 100 & 01, 21°05'S 15°47'E, 8-11.i.1975 (H29031) (1♂, SMWH); [13]Omaruru, 21°28'S 15°56'E, 15,17.xi.1971 (H5207) light at night (1♂, SMWH); [2]Kalkfontein, 22°08'S 20°53'E, x.1923 (J.S. Brown) (1♂, SAMC), [4]x.1925 (J.S. Brown) (1♂, SAMC); [8]Namib/Naukluft Park, Ganab, 23°06'S 15°33'E, 16.iii.1983 (C.D. Eardley) light trap (1♂, NCSA); [9]Mariental, 24°36'S 17°59'E, 18.xii.1974 (Empey) (1♂, DJBC); [15]Voigtsgrund, 1300 m, 24°49'S 17°26'E, 16.xii.1933 (K. Jordan) (1♂, NHML); [1]Namaland, Mukorob 14, 25°40'S 18°00'E, 12-14.iv.1974 (H18294) (1♂, SMWH); [16]Lüderitz, Augustfelde 42, 26°36'S 16°29'E, 17.x.1970 (H2569) (1♂, SMWH); [10, 17](11) Aar Farm, 25 mls. ESE Aus, 26°40'S 16°15'E, 15-17.i.1972 (Southern African Exp, B.M. 1972-1) (2♂, NHML); [14]Bethanien, Churutabis 108, 27°29'S 17°28'E, 4-12.x.1974 (H20972) (1♂, SMWH); [3]Fish River Canyon, nr main lookout Point, 27°40'S 17°35'E, 3.xii.1974 (M.W. Mansell) (1♂, NCSA); [11]Zebrafontein (Talana) near 87, 27°44'S 16°53'E, 5.xi.1980, *det.* by Petersen as *T. semele* Péring. (1♂, UPSA). SOUTH AFRICA: [7]Richtersveld, Rosyntjieberg, 28°27'S 17°20'E, 11.x.1974 (M. Mansell) light trap, hot still night (1♂, DJBC); [12]Cape, Upington, 28°28'S 21°14'E, I.1919 (Fath R. Solier) (1♂, SAMC); [5]Pofadder, 29°09'S 19°27'E, 25-26.xi.1933 (G. van Son) *det.* By Invrea as *T. semele* Pér. (1♂, DJBC).

ADDITIONAL MATERIAL. 24♂: NAMIBIA: Etosha National Park, Okaujetona, 18°54'S 15°45'E, 7.iii.1995 (P.S. Bayliss) light (1♂, DJBC); Outjo, Huab 261, 20°08'S 16°08'E, 29.xi.1972 (H10997) (1♂, SMWH); Omaruru, Eansiyo 100 & 101, 21°05'S 15°47'E, 8-11.i.1975 (H29031) (3♂, SMWH); Omaruru, 25-50 km NW, 21°28'S 15°56'E, 5.ii.1974 (M.E. Irwin) (1♂, UCDC); Kalkfontein, 22°08'S

20°53'E, x.1923 (J.S. Brown) (4♂, SAMC); Namib/Naukluft Park, Ganab, 23°06'S 15°33'E, 16.iii.1983 (C.D. Eardley) light trap (6♂, NCSA); Rehoboth, 23°18'S 17°10'E, 4.ii.1995 (P.S. Bayliss) light trap (1♂, DJBC); Mariental, 24°36'S 17°59'E, 18.xii.1974 (Empey) (1♂, DJBC); Bethanie, Churutabis 108, 26°25'S 17°05'E, 4-12.x.1974 (H20967) (1♂, SMWH); (11) Aar Farm, 25 mls. ESE Aus, 26°40'S 16°15'E, 15-17.i.1972 (Southern African Exp, B.M. 1972-1) (3♂, NHML); Keetmanshoop Dist., Naute Dam, 26°59'S 17°58'E, 15.ii.1983 (M.W. Mansell) (1♂, NCSA); Fish River Canyon, Hobas Camp, 27°40'S 17°45'E, 1.ii.1995 (P.S. Bayliss) light trap (1♂, DJBC); Lüderitz Distr., Boomrivier, 28°00'S 17°03'E, 20.xi.1993 (E. Marais) (1♂, SMWH).

DISTRIBUTION

This species occurs in southern Africa, with specimens recorded from Namibia and northwestern South Africa (fig. 75).

DISCUSSION

Bischoff (1920) described this species from a single male specimen, collected by Schultze at Walvis Bay. Bischoff, recognizing *T. pallidior* only as a subspecies of *T. semele*, felt that *T. pallidior* did not warrant species status. His (Bischoff 1920) description, which refers only to forewing venation and sculpturing, is vague, providing insufficient information for the accurate identification of the species. Without the holotype it was impossible to identify this species from either the description or Bischoff's (1920) key. Using Bischoff's key several newly described species from southern Africa key out as *T. pallidior*, while several specimens identified here as *T. pallidior* do not key out. Suárez's (1990) placement of *T. pallidior* as a subspecies of *T. semistriataeformis* is probably an error which occurred during the compilation of Suárez's research by Nonveiller, as Suárez never studied the southern African *Tricholabiodes*.

This species displays a sufficiently unique combination of characters warranting it recognition at the species level. The genitalia (fig. 60), particularly the shape of the parameres and the setae arrangement thereon, are unique to this species. *Tricholabiodes pallidior* is most similar to *T. concavus*. These two species can be separated by the presence of the longitudinal groove between the foveola and toruli, shape of the free border of the clypeus and the second submarginal cell, presence of an anterior mesal carina on S2 and the arrangement of setae on S4-S6. In *T. pallidior*, the longitudinal groove between the foveola and toruli is absent, the free border of the clypeus has the mesal area slightly protruding in a weak subrounded arch which is not upwardly flexed, the second submarginal cell is anteriorly petiolate, the anterior mesal carina of S2 is absent and S4-S6 has subequal amounts of flat and erect setae. In *T.*

concavus, the longitudinal groove between the foveola and toruli is present, the free border of clypeus has the mesal area strongly protruding in a slightly upwardly flexed arch, the second submarginal cell is either sessile anteriorly or anteriorly acute and barely reaching marginal cell, but never petiolate, the anterior mesal carina of S2 is present and S4-S6 has setae decumbent.

***Tricholabiodes concavus* sp. nov. ♂**

DIAGNOSIS

MALE: Body and appendages entirely pale to medium yellowish-brown, except for darker mandibular apices and dark yellowish-brown ventral tooth. Head with sides behind compound eyes distinctly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with scrobal carina arcuate, extending to scrobal tubercle. Free border of clypeus strongly protruding in a slightly upwardly flexed arch. Dorsellum laterally ridged. Mesepisternum with scrobe present, mesepisternal groove absent. Mesosternum with anteromesal surface, on each side of midline, with two conical protuberances. Forewing with 2nd submarginal cell either anteriorly sessile or anteriorly acute and barely reaching marginal cell although not petiolate. Mesal margin of metacoxa simple. Metasoma with anterior one-third of T2 with moderate to dense, medium punctation, interspaces shiny and subequal to puncture diameter; anterior mesal area of S2 with slight carina < 0.5 X length of sternum, S2 without felt line. Hypopygium with posterior margin shallowly concave. Genitalia as in fig. 55.

DESCRIPTION

MALE: Length 11.27 (8.29-11.53, mean 10.25) mm. Body and appendages entirely pale to medium yellowish-brown, except for darker mandibular apices and dark yellowish-brown ventral tooth; forewing lightly infuscated posterior to pterostigma; entire body covered with pallid setae.

Head 1.50 (1.46-1.59, mean 1.51) X as wide as long, 0.94 (0.92-1.02, mean 0.96) X as wide as mesosoma, 1.58 (1.50-1.59, mean 1.54) X as wide as vertex, 1.49 (1.40-1.55, mean 1.51) X as long as compound eye, sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with sparse to moderate, fine punctation, interspaces shiny and wider than puncture diameter; foveola shallow; surface between median ocellus and foveola with slight but sometimes indistinct, longitudinal median groove, between toruli longitudinal median groove subrounded in section and shallow; scrobal carina arcuate, extending to scrobal tubercle; antennal tubercle simple, irregular, shiny, with sparse fine punctation. Vertex 0.75 (0.65-0.76, mean 0.70) X as

long as wide, 1.28 (1.28-1.48, mean 1.39) X as wide as frons; posterior to lateral ocellus with moderate fine punctation, interspaces shiny and subequal to puncture diameter. Compound eye with ommatidia distinct. Ocelli large, convex and broadly oval, median ocellus 0.90 (0.79-1.16, mean 0.92) X as long as wide, interocellar distance 1.13 (1.01-1.41, mean 1.16) X ocellocular distance. Gena with moderate to dense, medium punctation, interspaces irregular. Clypeus 0.48 (0.43-0.48, mean 0.45) X as high as wide, free border strongly protruding in a slightly upwardly flexed arch; central portion raised, with slight oval mesal depression, depression subrounded in section, with sparse fine punctation, interspaces > 2 X puncture diameter; vestiture length longer than height of clypeus. Mandible higher than thick, dorsal rim with carina along entire length, ending at base of inner tooth; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth adjacent, inner tooth subrounded; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 0.75 (0.75-0.90, mean 0.85) X height at base. Antenna with scape 2.24 (2.06-2.50, mean 2.26) X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere simple; second flagellomere 1.76 (1.56-1.96, mean 1.69) X length of first, 1.03 (0.98-1.11, mean 1.04) X length of third.

Mesosoma, excluding anterior collar, 1.72 (1.64-1.79, mean 1.70) X as long as wide. Pronotum 0.88 (0.87-0.92, mean 0.90) X as wide as mesosoma, anterodorsal surface mesally with dense, fine to medium ill-defined punctation, becoming pit-like shallow reticulations laterally, strongly convex, humeral angle subrounded; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct and almost as large as a reticulation; posterior portion of lateral surface with sparse fine punctation, interspaces irregular and wider than puncture diameter, posterior margin impunctate. Mesoscutum 0.78 (0.71-0.81, mean 0.76) X as long as wide, 0.84 (0.84-0.91, mean 0.87) X as wide as pronotum; entirely with sparse medium punctation, interspaces smooth and wider than puncture diameter; posterolaterally with dense coarse punctation; posterolateral corner raised as an angulate tooth. Scutellum subtrapezoidal, posteriorly convergent, entire dorsal surface densely covered with coarse subcircular punctation. Dorsellum with dense medium ill-defined punctation, laterally ridged. Propodeum with areola longer than neighbouring areae. Mesepisternum, anterior to mesepisternal groove with sparse to moderate punctation, punctures increasing in size and density posteriorly becoming shallow pit-like reticulations, posterior to mesepisternal groove with pit-like, shallow reticulations, reticulations approximately same size as those on anterior portion of lateral surface of pronotum, scrobe a small subcircular depression, mesepisternal groove absent. Mesosternum with anterior concavity nearly impunctate, shiny, posteriorly smooth to sparsely and finely punctate; anteromesal surface, on each side of midline, with two conical protuberances.

Forewing: Pterostigma 1.00 (0.86-1.07, mean 0.98) X length of anterior margin of marginal cell. Marginal cell 2.90 (2.11-2.90, mean 2.48) X as long as wide, 2.02 (1.87-2.23, mean 2.01) X length of second submarginal. Second submarginal cell either sessile anteriorly or anteriorly acute and barely reaching marginal cell although not petiolate, 0.27 (0.25-0.30, mean 0.27) X length of discoidal cell. Third submarginal cell with vein 3r-m, tubular anterior to junction with accessory vein, nebulous becoming absent posterior to junction with accessory vein; medial vein spectral; accessory vein nebulous, 1.1 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur simple with greatest width at midlength; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.68 (0.68-0.80, mean 0.73) X length of longer spur, longer spur almost straight; basitarsus straight. Hind leg: Coxa entirely with sparse punctation, interspaces wider than puncture diameter, mesal margin simple, ventral surface convex; trochanter simple; femur with macrosetae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae sparsely but evenly distributed, shorter than shorter spur, shorter spur 0.70 (0.67-0.76, mean 0.70) X length of longer spur, longer spur almost straight, 0.77 (0.72-0.80, mean 0.75) X length of basitarsus; basitarsus with dense microsetae, macrosetae absent, ventral surface with several indistinct rows of short spines.

Metasoma 1.43 (1.23-1.55, mean 1.43) X as long as wide. First segment moderately broad, slightly constricted at apex, 2.50 (2.03-2.55, mean 2.37) X as long as wide, 3.02 (2.68-3.17, mean 2.94) X as long as high, 1.03 (1.04-1.08, mean 1.05) X as long as T2; tergum, except tergulum, irregular with moderate to dense, medium punctation, tergulum with moderate fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum with dense coarse punctation, median carina absent. T2 0.96 (0.89-1.06, mean 0.96) X as long as wide, 1.08 (0.99-1.13, mean 1.06) X as wide as mesosoma, vestiture sparse, anterior one-third with moderate to dense, medium punctation, interspaces shiny and subequal to puncture diameter, posterior two-thirds with moderate medium punctation, interspaces shiny and subequal to puncture diameter, felt line 0.53 (0.53-0.66, mean 0.60) X length of tergum, length anterior to felt line 0.73 (0.47-0.83, mean 0.72) X length of tergum posterior to felt line; S2 convex, setae evenly distributed and shorter than shorter mesotibial spur, anteriorly with moderate to dense, medium punctation, interspaces irregular and narrower than puncture diameter, mesal area with slight carina, < 0.5 X length of sternum, posteriorly with sparse to moderate, fine punctation, interspaces shiny and wider than puncture diameter, felt line absent. Pygidium transverse, posterior margin strongly convex, anterior one-third with sparse punctation, interspaces smooth and wider than puncture diameter, pygidial plate entirely smooth, except lateral and posterior

margin finely punctured; hypopygium with posterior margin shallowly concave, mesal area simple. Genitalia as in fig. 55.

FEMALE: Unknown.

MATERIAL EXAMINED

TYPE MATERIAL. Holotype: ♂, "SOUTH AFRICA: Witsand / Nature Reserve 28.20S / 23.05E 15-17.iii.1995 / P.S. Bayliss light trap" (SAMC).

Measured paratypes: 9♂: NAMIBIA: [6]Windhoek, Arnhem 222, 22°27'S 18°32'E, 23-27.x.1972 (H9685) (1♂, SMWH). SOUTH AFRICA: [1, 2, 3]S. Kalahari, Mata Mata, 25°45'S 20°00'E, vi.1956 (C. Koch) (3♂, TMSA); [4, 5]Witsands Nature Reserve, 28°20'E 23°05'E, 15-17.iii.1995 (P.S. Bayliss) light trap (2♂, DJBC); [7, 8, 9]Witsand Farm, 28°32'S 22°30'E, 2-4.ii.1979 (Lamoral, Bampton & Barnley) (3♂, DJBC).

Additional paratypes: 43♂: BOTSWANA: Tshane, 40 km N., 24°02'S 21°54'E, 11.i.1973 (E. Holm) at light (1♂, NCSA). SOUTH AFRICA: Kalahari Gemsbok Park, Nossob Camp, 25°30'S 20°24'E, 12-13.iii.1995 (P.S. Bayliss) light trap (1♂, DJBC); S. Kalahari, Mata Mata, 25°45'S 20°00'E, vi.1956 (C. Koch) (10♂, TMSA); Vanzylsrus, 26°53'S 22°03'E, 13.ii.1988 (G.D. Butler) (8♂, NCSA); Witsands Nature Reserve, 28°20'E 23°05'E, 15-17.iii.1995 (P.S. Bayliss) light trap (16♂, DJBC); Witsand Farm, 28°32'S 22°30'E, 2-4.ii.1979 (Lamoral, Bampton & Barnley) (7♂, DJBC).

DISTRIBUTION

This species occurs in southern Africa, with specimens recorded from Namibia, Botswana and northwestern most regions of South Africa (fig. 76).

DISCUSSION

Tricholabiodes concavus is most similar to *T. pallidior*. These two species can be separated by the presence of the longitudinal groove between the foveola and toruli, shape of the free border of the clypeus and the second submarginal cell, presence of an anterior mesal carina on S2 and the arrangement of setae on S4-S6. In *T. concavus*, the longitudinal groove between the foveola and toruli is present, the free border of the clypeus has the mesal area strongly protruding in a slightly upwardly flexed arch, the second submarginal cell is either sessile anteriorly or anteriorly acute and barely reaching marginal cell, but never petiolate, the anterior mesal carina of S2 is present and S4-S6 has setae decumbent. In *T. pallidior*, the longitudinal groove between the foveola and toruli is absent, the free border of the clypeus has the mesal area slightly protruding in a weak subrounded arch which is not upwardly flexed, the

second submarginal cell is anteriorly petiolate, the anterior mesal carina of S2 is absent and S4-S6 has subequal amounts of flat and erect setae.

ETYMOLOGY

"*concavus*" (L.), concave; in reference to the posterior margin of the hypopygium, with mesal area slightly concave.

Tricholabiodes acer **sp. nov.** ♂

DIAGNOSIS

MALE: Metasoma with T1 entirely medium yellowish-brown, T2-T6 dark reddish-brown, becoming dark yellowish-brown posteriorly, sterna paler than corresponding terga. Head with sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with scrobal carina absent. Free border of clypeus strongly protruding, subsquare and upwardly flexed. Middle and inner mandibular teeth adjacent. Dorsellum laterally ridged. Mesepisternum with scrobe present, mesepisternal groove absent. Mesosternum with anteromesal surface, on each side of midline, with two conical protuberances. Forewing with 2nd submarginal cell anteriorly acute and barely reaching marginal cell although not petiolate. Mesal margin of metacoxa with longitudinal carina > 0.6 X length of coxa. Metasoma with anterior one-third of T2 with dense coarse punctation; anterior mesal area of S2 with slight longitudinal carina < 0.5 X length of segment, S2 without felt line. S3-S6 with several ventrally directed setae, setae shorter than shorter mesotibial spur. Posterior margin of hypopygium shallowly concave. Genitalia as in fig. 68.

DESCRIPTION

MALE: Length 8.88 (7.60-9.67, mean 8.93) mm. Head, including clypeus and antenna, pale to medium yellowish-brown; mandible almost entirely pale yellowish-brown, apex black, ventral tooth pale reddish-black; mesosoma medium yellowish-brown; legs, including coxae and tibial spurs, golden yellow; forewing lightly infuscated posterior to marginal cell; pterostigma and wing veins pale yellowish-brown; metasoma with T1 entirely medium yellowish-brown, T2-T6 dark reddish-brown, becoming dark yellowish-brown posteriorly, sterna paler than corresponding terga; entire body covered in long, pallid setae.

Head 1.53 (1.48-1.55, mean 1.52) X as wide as long, 0.99 (0.94-0.99, mean 0.96) X as wide as

mesosoma, 1.53 (1.42-1.55, mean 1.51) X as wide as vertex, 1.47 (1.47-1.59, mean 1.51) X as long as compound eye, sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with sparse, fine to medium punctation, interspaces shiny and wider than puncture diameter; foveola shallow; surface between median ocellus and foveola slightly longitudinally depressed, between toruli longitudinal median groove subrounded in section and shallow; scrobal carina absent; antennal tubercle simple, sparsely and finely punctate. Vertex 0.64 (0.61-0.77, mean 0.66) X as long as wide, 1.31 (1.25-1.46, mean 1.32) X as wide as frons; posterior to lateral ocellus with sparse fine punctation, interspaces shiny and wider than puncture diameter. Compound eye with ommatidia distinct. Ocelli large, convex and broadly oval, median ocellus 0.92 (0.88-1.05, mean 0.94) X as long as wide, interocellar distance 1.15 (1.01-1.40, mean 1.19) X ocellocular distance. Gena with moderate medium punctation, interspaces shiny. Clypeus 0.45 (0.33-0.45, mean 0.39) X as high as wide, free border strongly protruding, subsquare and upwardly flexed; central portion raised and slightly convex, with sparse fine punctation, interspaces > 2 X puncture diameter; vestiture length longer than height of clypeus. Mandible higher than thick, dorsal rim with carina along entire length, ending at base of inner tooth; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth adjacent, inner tooth subrounded; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 0.78 (0.78-0.89, mean 0.84) X height at base. Antenna with scape 2.68 (1.95-2.86, mean 2.63) X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere simple; second flagellomere 1.69 (1.67-2.00, mean 1.79) X length of first, 1.02 (0.96-1.17, mean 1.07) X length of third.

Mesosoma, excluding anterior collar, 1.60 (1.60-1.68, mean 1.65) X as long as wide. Pronotum 0.89 (0.87-0.89, mean 0.87) X as wide as mesosoma, anterodorsal surface mesally with dense ill-defined punctation, becoming pit-like shallow reticulations laterally, strongly convex, humeral angle subrounded; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct and almost as large as a reticulation; posterior portion of lateral surface with sparse fine punctation, interspaces irregular and wider than puncture diameter, posterior margin impunctate. Mesoscutum 0.79 (0.78-0.82, mean 0.80) X as long as wide, 0.86 (0.86-0.91, mean 0.89) X as wide as pronotum; entirely with moderate medium punctation, interspaces smooth and subequal to puncture diameter, posterolaterally with dense, medium to coarse punctation; posterolateral corner raised as an angulate tooth. Scutellum subsquare, entire dorsal surface moderately covered with coarse subcircular punctation. Dorsellum with dense medium punctation, laterally simple, edges of lateral punctures may give the impression that dorsellum is laterally ridged. Propodeum with areola longer than neighbouring areae. Mesepisternum

with pit-like, shallow reticulations, reticulations approximately same size as those on anterior portion of lateral surface of pronotum, scrobe a distinct subcircular depression, mesepisternal groove absent. Mesosternum with anterior concavity nearly impunctate, shiny, posteriorly with sparse, fine to medium punctation; anteromesal surface, on each side of midline, with two conical protuberances.

Forewing: Pterostigma 0.82 (0.82-1.01, mean 0.89) X length of anterior margin of marginal cell. Marginal cell 2.37 (2.13-2.58, mean 2.38) X as long as wide, 1.51 (1.51-1.78, mean 1.63) X length of second submarginal. Second submarginal cell anteriorly acute and barely reaching marginal cell although not petiolate, 0.30 (0.26-0.31, mean 0.29) X length of discoidal cell. Third submarginal cell with vein 3r-m tubular anterior to junction with accessory vein, tubular, nebulous becoming spectral posterior to junction with accessory vein; medial vein spectral; accessory vein nebulous, 1.25 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur simple with greatest width at midlength; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.67 (0.67-0.77, mean 0.73) X length of longer spur, longer spur almost straight; basitarsus straight. Hind leg: Coxa entirely with sparse, fine to medium punctation, interspaces wider than puncture diameter, mesal margin with longitudinal carina > 0.6 X length of coxa, ventral surface convex; trochanter simple; femur with macrosetae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae sparsely but evenly distributed, shorter than shorter spur, shorter spur 0.63 (0.61-0.72, mean 0.65) X length of longer spur, longer spur almost straight, 0.74 (0.61-0.79, mean 0.71) X length of basitarsus; basitarsus with dense microsetae, macrosetae absent, ventral surface with two rows of short spines.

Metasoma 1.46 (1.31-1.46, mean 1.37) X as long as wide. First segment moderately narrow and fairly long, slightly constricted at apex, 2.23 (1.72-2.23, mean 2.00) X as long as wide, 2.58 (2.13-2.58, mean 2.36) X as long as high, 1.20 (0.89-1.28, mean 1.08) X as long as T2; tergum, except tergulum, with dense coarse subcircular punctation, tergulum with moderate fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum with dense coarse punctation, median carina interrupted. T2 0.85 (0.81-0.95, mean 0.88) X as long as wide, 0.97 (0.96-1.05, mean 0.98) X as wide as mesosoma, vestiture subdecumbent to suberect, anterior one-third with dense coarse ill-defined punctation, interspaces narrower than puncture diameter, posterior two-thirds with moderate medium punctation, interspaces shiny and subequal to puncture diameter, felt line 0.52 (0.45-0.58, mean 0.50) X length of tergum, length anterior to felt line 0.66 (0.66-0.81, mean 0.75) X length of tergum posterior to felt line; S2 convex, setae evenly distributed and shorter than

shorter mesotibial spur, entirely with moderate medium punctation, interspaces shiny and subequal to puncture diameter, anterior mesal area with slight longitudinal carina < 0.5 X length of segment, felt line absent. S3-S6 with several ventrally directed setae, setae shorter than shorter mesotibial spur. Pygidium with posterior margin strongly convex, anterior one-third with sparse punctation, interspaces smooth and wider than puncture diameter, pygidial plate entirely smooth, except lateral and posterior margin finely punctured; hypopygium with posterior margin shallowly concave, mesal area simple. Genitalia as in fig. 68.

FEMALE: Unknown.

MATERIAL EXAMINED

TYPE MATERIAL. Holotype: ♂, "NAMIBIA: Fish River / Canyon, Hobas Camp / 27°40'S 17°45'E / 1.ii.1995 P.S. Bayliss / light trap" (SMWH).

Measured paratypes: 5♂: NAMIBIA: [2]Kalkfontein, 22°08'S 20°53'E, x.1922 (J.S. Brown) *det.* as *Tricholabiodes semele* Pér. subsp. *pallidior* Bisch. (1♂, SAMC); [3]Tses, 25°58'S 18°08'E, 1924 (J.S. Brown) (1♂, SAMC); [5]Bethanie, Riverside 135, 26°36'S 16°56'E, 16-23.x.1971 (H4934) malaise trap (1♂, SMWH); [4]Bethanien, Huns 106, 27°50'S 17°10'E, 29.ix-4.x.1974 (H20763) (1♂, SMWH); [1]Lüderitz, Boomrivier, 28°00'S 17°03'E, 20.xi.1993 (E. Marais) (1♂, SMWH).

Additional paratypes: 9♂: NAMIBIA: Mariental, 60 km S, 24°40'S 17°59'E, 2.ii.1995 (P.S. Bayliss) light trap (2♂, DJBC); Lüderitz, Kanaän 104, 25°50'S 16°09'E, 6-7.x.1972 (H9419) (1♂, SMWH); Bethanien, Churutabis 108, 27°29'S 17°28'E, 4-12.x.1974 (H20969) (2♂, SMWH); Fish River Canyon, Hobas Camp, 27°40'S 17°45'E, 1.ii.1995 (P.S. Bayliss) light trap (4♂, DJBC).

DISTRIBUTION

This species occurs along the western coast of southern Africa with specimens recorded only from Namibia (fig. 77).

DISCUSSION

Tricholabiodes acer is most similar to *T. testaceus* from which it differs mainly in the shape of the posterior margin of the head, sculpturing on the mesal margin of the metacoxa and setae arrangement on S3-S6. In *T. acer*, the head has sides behind the compound eyes slightly convergent posteriorly, the mesal margin of the metacoxa has a longitudinal carina > 0.6 X length of the coxa and S3-S6 has several ventrally directed setae. In *T. testaceus*, the head has sides behind the compound eyes strongly convergent posteriorly, the mesal margin of the metacoxa has a longitudinal carina and S3-S6 has setae

decumbent.

ETYMOLOGY

"*acer*" (L.), pointed: in reference to the shape of the second submarginal cell

Tricholabiodes tortilis **sp. nov.** ♂

DIAGNOSIS

MALE: Body and appendages entirely pale yellowish-brown, except for darker mandibular apices and dark yellowish-brown ventral tooth. Head with sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with scrobal carina absent. Free border of clypeus strongly protruding, subsquare and slightly upwardly flexed. Middle and inner mandibular teeth adjacent, inner tooth subrounded. Mesepisternum with scrobe shallow, almost indistinct, mesepisternal groove absent. Mesosternum with anteromesal surface, on each side of midline, with two conical protuberances. Forewing with 2nd submarginal cell anteriorly acute and barely reaching marginal cell, although not petiolate. Mesal margin of metacoxa simple. Metasoma with T2 entirely with sparse fine punctation, anteriorly interspaces 2 X puncture diameter, posteriorly interspaces 3-4 X puncture diameter; anterior mesal area of S2 without carina, S2 without felt line. S3-S6 with subequal amounts of decumbent and erect setae, setae shorter than smaller mesotibial spur. Posterior margin of hypopygium shallowly concave. Genitalia as in fig. 61.

DESCRIPTION

MALE: Length 10.68 (8.05-12.99, mean 10.41) mm. Body and appendages entirely pale yellowish-brown, except for darker mandibular apices and dark yellowish-brown ventral tooth; forewing very lightly infuscated posterior to pterostigma but sometimes indistinct; entire body, particularly the metasoma, covered with pallid setae.

Head 1.54 (1.39-1.54, mean 1.47) X as wide as long, 0.93 (0.84-0.97, mean 0.92) X as wide as mesosoma, 1.56 (1.48-1.60, mean 1.55) X as wide as vertex, 1.49 (1.23-1.59, mean 1.47) X as long as compound eye, sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with sparse fine punctation, interspaces shiny and wider than puncture diameter; foveola deep; surface between median ocellus and foveola without longitudinal median groove though slightly longitudinally depressed, between toruli longitudinal median groove deep;

scrobal carina absent; antennal tubercle simple, with sparse fine punctation. Vertex 0.62 (0.61-0.69, mean 0.65) X as long as wide, 1.30 (1.28-1.36, mean 1.31) X as wide as frons; posterior to lateral ocellus with sparse, fine to medium punctation, interspaces shiny and wider than puncture diameter. Compound eye with ommatidia indistinct. Ocelli large, convex and broadly oval, median ocellus 0.77 (0.77-0.91, mean 0.86) X as long as wide, interocellar distance 1.95 (1.50-1.99, mean 1.76) X ocellocular distance. Gena with sparse medium punctation, becoming moderately punctured posteriorly, interspaces shiny. Clypeus 0.41 (0.38-0.46, mean 0.41) X as high as wide, free border strongly protruding, subsquare and slightly upwardly flexed; central portion raised and slightly convex, with moderate fine punctation, interspaces > puncture diameter; vestiture length longer than height of clypeus. Mandible higher than thick, dorsal rim with carina along entire length of mandible, ending at base of inner apical tooth; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth adjacent, inner tooth subrounded; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 0.87 (0.74-0.88, mean 0.84) X height at base. Antenna with scape 1.99 (1.77-2.23, mean 2.02) X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere simple; second flagellomere 1.55 (1.50-1.77, mean 1.61) X length of first, 1.02 (0.96-1.11, mean 1.04) X length of third.

Mesosoma, excluding anterior collar, 1.73 (1.56-1.83, mean 1.70) X as long as wide. Pronotum 0.90 (0.87-0.92, mean 0.90) X as wide as mesosoma, anterodorsal surface mesally with dense ill-defined punctation, becoming pit-like shallow reticulations laterally, strongly convex, humeral angle subrounded; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct and almost as large as a reticulation; posterior portion of lateral surface rough striated, posterior margin impunctate. Mesoscutum 0.77 (0.76-0.85, mean 0.80) X as long as wide, 0.90 (0.85-0.90, mean 0.87) X as wide as pronotum; between notauli with sparse medium punctation, interspaces smooth and wider than puncture diameter; laterally with sparse to moderate, medium punctation, posterolaterally with dense coarse punctation; posterolateral corner raised as an angulate tooth. Scutellum subsquare, entire dorsal surface moderately to densely covered with coarse subcircular punctation. Dorsellum with dense medium punctation, laterally simple. Propodeum with areola same length as neighbouring areae. Mesepisternum with pit-like, shallow reticulations, reticulations approximately same size as those on anterior portion of lateral surface of pronotum, scrobe shallow, almost indistinct, mesepisternal groove absent. Mesosternum with anterior concavity nearly impunctate, shiny, posteriorly becoming moderately to densely punctate, punctures fine to medium, anteromesal surface, on each side of midline, with two conical protuberances.

Forewing: Pterostigma 1.77 (1.43-1.78, mean 1.63) X length of anterior margin of marginal cell. Marginal cell 2.32 (1.60-2.68, mean 2.18) X as long as wide, 1.55 (1.55-2.00, mean 1.76) X length of second submarginal. Second submarginal cell anteriorly acute and barely reaching marginal cell although not petiolate, 0.35 (0.24-0.35, mean 0.29) X length of discoidal cell. Third submarginal cell with vein 3r-m nebulous anterior to junction with accessory vein, spectral becoming absent posterior to junction with accessory vein; medial vein absent; accessory vein nebulous, 1.35 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur simple with greatest width at midlength; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.76 (0.71-0.82, mean 0.75) X length of longer spur, longer spur almost straight; basitarsus straight. Hind leg: Coxa entirely with sparse punctation, interspaces wider than puncture diameter, mesal margin simple, ventral surface convex; trochanter simple; femur with macrosetae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae only on posterior surface with several setae anteriorly, shorter than shorter spur, shorter spur 0.75 (0.68-0.75, mean 0.73) X length of longer spur, longer spur almost straight, 0.64 (0.60-0.68, mean 0.63) X length of basitarsus; basitarsus with dense microsetae, macrosetae absent, ventral margin with one row of short spines.

Metasoma 1.64 (1.33-1.64, mean 1.45) X as long as wide. First segment moderately broad and fairly long, very slightly constricted at apex, 2.06 (1.68-2.14, mean 1.97) X as long as wide, 2.40 (2.33-2.85, mean 2.48) X as long as high, 1.07 (0.99-1.10, mean 1.07) X as long as T2; tergum, except tergulum, irregular with sparse to moderate, medium punctation, punctures ill-defined, tergulum with moderate fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum with dense coarse punctation, median carina irregular. T2 0.90 (0.78-0.91, mean 0.86) X as long as wide, 0.99 (0.97-1.09, mean 1.03) X as wide as mesosoma, vestiture subdecumbent to suberect, entirely with sparse fine punctation, anteriorly interspaces 2 X puncture diameter, posteriorly interspaces 3-4 X puncture diameter, felt line 0.56 (0.50-0.62, mean 0.54) X length of tergum, length anterior to felt line 0.53 (0.44-0.76, mean 0.62) X length of tergum posterior to felt line; S2 simple, convex, setae evenly distributed and shorter than shorter mesotibial spur, anteriorly with moderate medium punctation, interspaces subequal to puncture diameter, anterior mesal area without carina, posteriorly with sparse to moderate, fine punctation, interspaces shiny and wider than puncture diameter, felt line absent. S3-S6 with subequal amounts of decumbent and erect setae, setae shorter than smaller mesotibial spur. Pygidium with posterior margin strongly convex, anterior one-third with moderate punctation, interspaces smooth and subequal to puncture diameter, pygidial plate entirely smooth, except lateral and posterior margin finely punctured; hypopygium with posterior margin

shallowly concave, mesal area simple. Genitalia as in fig. 61.

FEMALE: Unknown.

MATERIAL EXAMINED

TYPE MATERIAL. Holotype: ♂, "NAMIBIA: Uis / 40 km W, Brandberg / 21.08S 14.35E / 1-2.iii.1994 P.S. Bayliss / light trap" (SMWH).

Measured paratypes: 8♂: NAMIBIA: [5]Outjo, Bethanis 514, 20°24'S 14°24'E, 8-10.v.1973 (H12737) (1♂, SMWH); [3]Klein Spitzekopte, 36 mi. W. Usakos, 920, 22°00'S 15°45'E, 1.i.1967 (E.S. Ross & K. Lorenzen) (1♂, CASC); [1, 2]Namib/Naukluft Park, Ganab, 23°06'S 15°33'E, 16.iii.1983 (C.D. Eardley) light trap (2♂, NCSA); [8]Gobabeb, 408 m, 23°33'S 15°05'E, 5.xi.1978 (Wharton) (1♂, DJBC); [6]Naroib, 24°20`S 16°52`E, vii.1950 (R.G. Strey) (1♂, TMSA); [4]Zesfontein, 26°06'S 28°22'S, ii.1925 (Mus. Exped.) (1♂, SAMC); [7]Diamond Area no. 1, Klinghardtberge, 27°19'S 15°46'E, 20/21.x.1974 (M.W. Mansell) collected at mercury vapour light, arid rocky terrain (1♂, NCSA).

Additional paratypes: 39♂: NAMIBIA: Welwitschia, 13 mi. SE, 800 m, 20°22'S 14°58'E, 22.xii.1966 (K. Lorenzen) (2♂, CASC); Outjo, Bethanis 514, 20°24'S 14°24'E, 8-10.v.1973 (H12737) (3♂, SMWH); Brandberg, 21°08'S 14°35'E, 13.viii.1950 (R.G. Strey) *det.* as *T. lividus* (1♂, TMSA) Uis, 40 km W., Brandberg, 21°08'S 14°35'E, 1-2.iii.1994 (P.S. Bayliss) light trap (3♂, DJBC); Karibib, Noab 69, 22°08'S 15°34'E, 14-15.i.1975 (H29292) (1♂, SMWH); Namib/Naukluft Park, Ganab, 23°06'S 15°33'E, 16.iii.1983 (C.D. Eardley) light trap (14♂, NCSA); Gobabeb, Game Reserve No. 3, 23°33'S 15°05'E, 17.v.1959 (L. Vari) (1♂, TMSA); Gobabeb, 408 m, 23°33'S 15°05'E, 5.xi.1978 (Wharton) (1♂, DJBC); Gobabeb, 23°33'S 15°05'E, 10.ii.1988 (C.D. Eardley) light trap (1♂, DJBC); Namib/ Naukluft Park, Kuiseb R nr Gobabeb, 23°34'S 15°03'E, 18.ii-20.iii.1983 (Nat. Coll. Kuiseb Survey) (1♂, NCSA); Karibib, Bethel 89, 24°27'S 19°53'E, 2-3.xi.1974 (H21631) (3♂, SMWH); Mariental, 60 km S., 24°40'S 17°59'E, 2.ii.1995 (P.S. Bayliss) light trap (1♂, DJBC); Maltahöhe District, Wolwedans 144, E. of Chateau dune, 25°06'S 15°59'E, 13-18.iii.1992 (E. Griffins) pres. pitf. trap (1♂, SMWH); Maltahöhe Distr., Kronenhof 117, 25°29'S 16°27'E, 11.i.1990 (J. Irish & E. Marais) (1♂, SMWH); Zesfontein, 26°06'S 28°22'S, ii.1925 (Mus. Exped.) (3♂, SAMC); Luderitz District, Boomrivier, 28°00'S 17°03'E, 20.xi.1993 (E. Marais) (2♂, SMWH).

DISTRIBUTION

This species occurs along the west coast of southern Africa, with specimens recorded only from Namibia (fig. 77).

DISCUSSION

This species is most similar to *T. petiolatus*. These two species can be separated by the depth of the longitudinal groove between the foveola and toruli, the shape of the second submarginal cell, presence of macrosetae on the metabasitarsus, and the genitalia (figs 61 & 62), in particular, the shape of the parameres. In *T. tortilis*, the longitudinal groove between the foveola and toruli is deep, the second submarginal cell is anteriorly acute and barely reaching the marginal cell and the metabasitarsus has macrosetae absent. In *T. petiolatus*, the longitudinal groove between the foveola and toruli is shallow, the second submarginal cell is petiolate anteriorly and the metabasitarsus has macrosetae present.

ETYMOLOGY

"*tortilis*" (L.), twisted; in reference to the shape of the apices of the parameres.

***Tricholabiodes petiolatus* sp. nov. ♂**

DIAGNOSIS

MALE: Body and appendages entirely golden yellow to pale yellowish-brown, except for darker mandibular apices and medium to dark yellowish-brown ventral tooth. Head with sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with scrobal carina absent. Free border of clypeus with mesal area strongly protruding in a slightly upwardly flexed arch. Middle and inner mandibular tooth adjacent. Mesepisternum with scrobe and mesepisternal groove absent. Mesosternum with anteromesal surface, on each side of midline, with two conical protuberances. Forewing with 2nd submarginal cell petiolate anteriorly. Mesal margin of metacoxa simple. Metasoma with T2 entirely with sparse fine punctation, anteriorly interspaces 2-3 X wider than puncture diameter, posteriorly interspaces 5-6 X wider than puncture diameter; anterior mesal area of S2 without carina, S2 without felt line. S3-S6 with subequal amounts of decumbent and erect setae, setae shorter than smaller mesotibial spur. Posterior margin of hypopygium shallowly concave. Genitalia as in fig. 62.

DESCRIPTION

MALE: Length 11.25 (7.15-13.70, mean 10.44) mm. Body and appendages entirely golden yellow to pale yellowish-brown, except for darker mandibular apices and medium to dark yellowish-brown ventral tooth; forewing very lightly infuscated posterior to marginal cell; entire body, particularly the metasoma, covered in pallid setae.

Head 1.41 (1.41-1.50, mean 1.45) X as wide as long, 0.91 (0.85-1.01, mean 0.92) X as wide as mesosoma, 1.48 (1.45-1.66, mean 1.52) X as wide as vertex, 1.67 (1.53-1.70, mean 1.61) X as long as compound eye, sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with sparse fine punctation, interspaces shiny and wider than puncture diameter; foveola shallow; surface between median ocellus and foveola smooth, between toruli longitudinal median groove subrounded in section and shallow; scrobal carina absent, scrobal tubercle small; antennal tubercle simple, with sparse fine punctation. Vertex 0.76 (0.60-0.76, mean 0.69) X as long as wide, 1.34 (1.29-1.51, mean 1.38) X as wide as frons; posterior to lateral ocellus with sparse fine punctation, interspaces shiny and wider than puncture diameter. Compound eye with ommatidia distinct. Ocelli large, convex and broadly oval, median ocellus 0.88 (0.69-0.89, mean 0.82) X as long as wide, interocellar distance 1.38 (1.14-1.73, mean 1.42) X ocellocular distance. Gena with dense coarse punctation, sometimes punctures decreasing in density and size posteriorly, interspaces shiny. Clypeus 0.38 (0.37-0.43, mean 0.40) X as high as wide, free border with mesal area strongly protruding in a slightly upwardly flexed arch; central portion raised and slightly convex, with sparse fine punctation, interspaces > 2 X puncture diameter; vestiture length longer than height of clypeus. Mandible higher than thick, dorsal rim with carina on entire length ending at base of inner tooth; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth adjacent, inner tooth subrounded; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 0.98 (0.89-1.00, mean 0.94) X height at base. Antenna with scape 2.02 (1.82-2.28, mean 2.06) X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere simple; second flagellomere 1.67 (1.52-1.90, mean 1.69) X length of first, 1.05 (0.97-1.09, mean 1.03) X length of third.

Mesosoma, excluding anterior collar, 1.80 (1.57-1.90, mean 1.74) X as long as wide. Pronotum 0.90 (0.87-0.93, mean 0.90) X as wide as mesosoma, anterodorsal surface mesally with dense ill-defined punctation, becoming pit-like shallow reticulations laterally, strongly convex, humeral angle subrounded; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct and almost as large as a reticulation; posterior portion of lateral surface rough striated, posterior margin impunctate. Mesoscutum 0.81 (0.76-0.89, mean 0.82) X as long as wide, 0.90 (0.86-0.91, mean 0.89) X as wide as pronotum; between notauli with sparse to moderate, medium punctation, interspaces smooth and wider than puncture diameter; laterally with sparse medium punctation, posterolaterally with dense coarse punctation; posterolateral corner raised as an angulate tooth. Scutellum subsquare, entire dorsal surface densely covered with coarse subcircular punctation. Dorsellum with dense coarse punctation, laterally simple. Propodeum with areola longer than neighbouring areae. Mesepisternum with pit-like, shallow

reticulations, reticulations approximately same size as those on anterior portion of lateral surface of pronotum, scrobe and mesepisternal groove absent. Mesosternum with anterior concavity nearly impunctate, shiny, posteriorly smooth; anteromesal surface, on each side of midline, with two conical protuberances.

Forewing: Pterostigma 2.04 (1.39-2.04, mean 1.72) X length of anterior margin of marginal cell. Marginal cell 2.79 (2.30-2.79, mean 2.53) X as long as wide, 1.71 (1.40-2.22, mean 1.72) X length of second submarginal. Second submarginal cell petiolate anteriorly, 0.29 (0.27-0.39, mean 0.31) X length of discoidal cell. Third submarginal cell with vein 3r-m nebulous becoming absent posteriorly; medial vein spectral; accessory vein nebulous, 1.35 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur simple with greatest width at midlength; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.75 (0.66-0.76, mean 0.72) X length of longer spur, longer spur almost straight; basitarsus straight. Hind leg: Coxa entirely with sparse punctation, interspaces wider than puncture diameter, mesal margin simple, ventral surface convex; trochanter simple; femur with macrosetae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae sparsely but evenly distributed, longer than shorter spur, shorter than longer spur, shorter spur 0.69 (0.69-0.75, mean 0.72) X length of longer spur, longer spur almost straight, 0.63 (0.60-0.65, mean 0.62) X length of basitarsus; basitarsus with dense microsetae, macrosetae only on posterior margin and shorter than those on tibia, ventral surface with several rows of slender spines.

Metasoma 1.71 (1.12-1.71, mean 1.45) X as long as wide. First segment moderately narrow and fairly long, 2.04 (1.92-2.11, mean 2.02) X as long as wide, 2.65 (2.30-2.77, mean 2.59) X as long as high, 0.90 (0.89-1.05, mean 0.97) X as long as T2; tergum, except tergulum, irregular with sparse to moderate, medium punctation, punctures ill-defined, tergulum with moderate fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum anteriorly with dense coarse punctation, punctures decreasing in density and size posteriorly, median carina weak, interrupted. T2 0.94 (0.85-0.96, mean 0.92) X as long as wide, 0.99 (0.94-1.05, mean 1.00) X as wide as mesosoma, vestiture subdecumbent to suberect, entirely with sparse fine punctation, anteriorly interspaces 2-3 X wider than puncture diameter, posteriorly interspaces 5-6 X wider than puncture diameter, felt line 0.51 (0.47-0.63, mean 0.55) X length of tergum, length anterior to felt line 0.71 (0.59-0.95, mean 0.74) X length of tergum posterior to felt line; S2 convex, setae evenly distributed and shorter than shorter mesotibial spur, entirely with sparse fine punctation, anteriorly interspaces 2 X puncture diameter, posteriorly interspaces 3-4 X puncture diameter, mesal area without carina, felt line

absent. S3-S6 with subequal amounts of decumbent and erect setae, setae shorter than smaller mesotibial spur. Pygidium with posterior margin convex, anterior one-third with moderate medium punctation, interspaces smooth and subequal to puncture diameter, pygidial plate entirely smooth, except lateral and posterior margin finely punctured; hypopygium with posterior margin shallowly concave, mesal area simple. Genitalia as in fig. 62.

FEMALE: Unknown.

MATERIAL EXAMINED

TYPE MATERIAL. Holotype: ♂, "[NAMIBIA =] Uniab Delta Area / 20°11'S., 13°13'E. / SKELETON COAST PARK / 9-12 Apr.[il] 1987 / J. Irish, E. Marais" (SMWH).

Measured paratypes: 7♂: ANGOLA: [2]Pico Avezedo, 23-27.vi.1925 (Ac. 28500) (1♂,AMNH); [3]Mocámedes District, Mucungo, Alt. 950 ft, 14°03'S 18°30'E, 20.x.1930 (Acc. 8994) (1♂, ICCM); [4]Capelongo, 14°53'S 15°05'E, 25.vii.1925 (Ac. 28500) (1♂, AMNH); [1]24 mi. N.E. Mocámedes, 400 m, 15°10'S 12°09'E, 12.xi.1966 (E.S. Ross & K. Lorenzen) (1♂, SMWH). NAMIBIA: [7]Otjinhungwa, 17°16'S 12°26'E, 17-22.xi.1970 (H2567) (1♂, SMWH); [5]Kaokoland, Otjinhungwa, 17°16'S 12°26'E, 19-22.viii.1973 (H13646) (1♂, SMWH); [6]Wolwedans 144, Maltahóhe District, E. of Chateau dune, 25°06'S 15°59'E, 13-18.iii.1992 (E. Griffins) Pres. pitf. trap (1♂, SMWH).

Additional paratypes: 8♂: ANGOLA: Mocámedes, Mucungo, alt. 950 ft., 14°03'S 18°30'E, 25.x.1930 (Acc.8994) (1♂, ICCM); Capelongo, 14°53'S 15°05'E, 25.vii.1925 (Ac. 28500) (1♂, AMNH). NAMIBIA: Otjinhungwa, 17°16'S 12°26'E, 17-22.xi.1970 (H2567) (1♂, SMWH); Kaokoland, Otjinhungwa, 17°16'S 12°26'E, 19-22.viii.1973 (H13646) (1♂, SMWH); Omatjenguma, 8 km NE, 17°58'S 12°21'E, 22-25.xi.1970 (H2565) (1♂, SMWH); Skeleton Coast Park, Uniab Delta Area, 20°11'S 13°13'E, 9-12.iv.1987 (J. Irish & E. Marais) (1♂, SMWH); Wolwedans 144, Maltahóhe District, E. of Chateau dune, 25°06'S 15°59'E, 13-18.iii.1992 (E. Griffins) Pres. pitf. trap (1♂, SMWH); Asab, 25°29'S 17°59'E, vii.1925 (J.S. Brown) (1♂, SMWH).

DISTRIBUTION

This species occurs along the west coast of southern Africa, with specimens recorded from southern Angola and northern Namibia (fig. 78).

DISCUSSION

This species is most similar to *T. tortilis*. These two species can be separated by the depth of the longitudinal groove between the foveola and toruli, shape of the second submarginal cell, presence of

macrosetae on the metabasitarsus and the genitalia (figs 61 & 62), in particular, the shape of the parameres. In *T. petiolatus*, the longitudinal groove between the foveola and toruli is shallow, the second submarginal cell is anteriorly petiolate and the metabasitarsus has macrosetae present. In *T. tortilis*, the longitudinal groove between the foveola and toruli is deep, the second submarginal cell is anteriorly acute and barely reaching the marginal cell and the metabasitarsus has macrosetae absent.

ETYMOLOGY

"*petiolatus*" (L.), petiolate; in reference to the shape of the second submarginal cell.

***Tricholabiodes imbellis* (André, 1895). ♂**

Mutilla (*Sphaeropthalma* [*sic*]) *imbellis* André, 1895:516. ♂
Mutilla semele Péringuey, 1898:86. ♂
Mutilla (Tricholabiodes) semele Pér.[inguey]; André, 1901:285. ♂
T. [*richolabiodes*] *semele* Péringuey; André, 1902: 21. ♂
Tricholabioides [*sic*] *semele* Péringuey; Bischoff ,1920:103, 107. ♂
Tricholabiodes imbellis (André); Brothers, 1983:328. ♂
Tricholabioides [*sic*] *semele* Péringuey; Suárez, 1990:187. ♂
Mutilla semele Péringuey; Brothers (MS). ♂

Since the lectotype of *T. imbellis* was not studied, only range and mean values for all specimens studied are included in the redescription. The values for the lectotype of *T. semele* are provided in square brackets.

DIAGNOSIS

MALE: Metasoma with T1 entirely medium yellowish-brown, T2-T6 dark reddish-brown, becoming paler posteriorly, sterna paler than corresponding terga. Head with sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with scrobal carina arcuate, not reaching scrobal tubercle. Free border of clypeus with mesal area strongly protruding, subsquare and upwardly flexed. Middle and inner mandibular teeth adjacent, inner tooth subrounded. Mesepisternum with scrobe present, mesepisternal groove absent. Mesosternum with anteromesal surface, on each side of midline, with two conical protuberances. Forewing with 2nd submarginal cell petiolate anteriorly. Macrosetae of mesotibia longer than shorter spur, shorter than

longer spur. Mesal margin of metacoxa simple; macrosetae of metatibia longer than shorter spur, shorter than longer spur. Metasoma with T2 entirely with sparse, fine to medium punctation. S3-S6 with setae clumped, erect and longer than smaller mesotibial spur. Posterior margin of hypopygium shallowly concave. Genitalia as in fig. 59.

REDESCRIPTION

MALE: Length 8.44-12.79 ([12.75] mean 10.48) mm. Head, including clypeus and antenna, pale to medium yellowish-brown; mandible almost entirely pale yellowish-brown, apex black, ventral tooth pale reddish-black; mesosoma medium yellowish-brown; legs, including coxae and tibial spurs, pale yellowish-brown; forewing lightly infuscated posterior to pterostigma; pterostigma and wing veins pale yellowish-brown; metasoma with T1 entirely medium yellowish-brown, T2-T6 dark reddish-brown, becoming paler posteriorly, sterna paler than corresponding terga; entire body covered in long, pallid setae.

Head 1.35-1.55 ([1.46] mean 1.42) X as wide as long, 0.84-1.03 ([0.90] mean 0.94) X as wide as mesosoma, 1.46-1.60 ([1.48] mean 1.53) X as wide as vertex, 1.45-1.72 ([1.51] mean 1.57) X as long as compound eye, sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with sparse fine punctation, interspaces shiny and wider than puncture diameter; foveola shallow; surface between median ocellus and foveola smooth, between toruli longitudinal median groove rounded in section and shallow; scrobal carina arcuate, not reaching scrobal tubercle but sometimes indistinct; antennal tubercle simple, with sparse fine punctation. Vertex 0.63-0.84 ([0.68] mean 0.73) X as long as wide, 1.23-1.40 ([1.39] mean 1.30) X as wide as frons; posterior to lateral ocellus with sparse fine punctation, interspaces shiny and wider than puncture diameter. Compound eye with ommatidia distinct. Ocelli large, convex and broadly oval, median ocellus 0.76-0.97 ([0.79] mean 0.87) X as long as wide, interocellar distance 0.89-1.60 ([1.25] mean 1.31) X ocellocular distance. Gena with sparse medium punctation, interspaces shiny. Clypeus 0.34-0.45 ([0.42] mean 0.38) X as high as wide, free border with mesal area strongly protruding, subsquare and upwardly flexed; central portion raised, with slight oval mesal depression, depression subrounded in section, with sparse fine punctation, interspaces > 2 X puncture diameter; vestiture length longer than height of clypeus. Mandible higher than thick, dorsal rim with carina along entire length, ending at base of inner tooth; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth adjacent, inner tooth subrounded; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 0.75-0.93 ([0.89] mean 0.84) X height at base. Antenna with scape 2.00-2.23 ([2.11] mean 2.16) X length of first

flagellomere, anterior surface with one longitudinal carina; first flagellomere simple; second flagellomere 1.44-1.82 ([1.61] mean 1.46) X length of first, 0.90-1.19 ([1.07] mean 1.01) X length of third.

Mesosoma, excluding anterior collar, 1.45-1.82 ([1.59] mean 1.65) X as long as wide. Pronotum 0.87-0.93 ([0.89] mean 0.89) X as wide as mesosoma, anterodorsal surface mesally with dense ill-defined punctation, becoming pit-like shallow reticulations laterally, strongly convex, humeral angle subrounded; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct and almost as large as a reticulation; posterior portion of lateral surface with sparse fine punctation, interspaces irregular and wider than puncture diameter, posterior margin impunctate. Mesoscutum 0.72-1.08 ([0.75] mean 0.76) X as long as wide, 0.84-0.94 ([0.87] mean 0.89) X as wide as pronotum; between notauli with sparse to moderate, medium punctation, interspaces smooth and wider than puncture diameter; laterally with sparse medium punctation, posterolaterally with dense, medium to coarse punctation; posterolateral corner raised as an angulate tooth. Scutellum subsquare, with moderate medium punctation. Dorsellum with dense medium punctation, laterally simple. Propodeum with areola shorter than neighbouring areae. Mesepisternum with pit-like, shallow reticulations, reticulations approximately same size as those on anterior portion of lateral surface of pronotum, scrobe a distinct subcircular depression, mesepisternal groove absent. Mesosternum with anterior concavity nearly impunctate, shiny, posteriorly with sparse, fine to medium punctation; anteromesal surface, on each side of midline, with two conical protuberances.

Forewing: Pterostigma 1.00-1.34 ([1.00] mean 1.19) X length of anterior margin of marginal cell. Marginal cell 2.04-2.80 ([2.43] mean 2.30) X as long as wide, 1.43-2.65 ([1.80] mean 1.92) X length of second submarginal. Second submarginal cell petiolate anteriorly, 0.21-0.36 ([0.30] mean 0.27) X length of discoidal cell. Third submarginal cell with vein 3r-m nebulous anterior to junction with accessory vein, nebulous becoming spectral posterior to junction with accessory vein; medial vein spectral; accessory vein nebulous, 1.3 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur simple with greatest width at midlength; tibia simple with macrosetae longer than shorter spur, shorter than longer spur, shorter spur 0.68-0.83 ([0.75] mean 0.75) X length of longer spur, longer spur almost straight; basitarsus straight. Hind leg: Coxa entirely with sparse punctation, interspaces wider than puncture diameter, mesal margin simple, ventral surface convex; trochanter simple; femur with macrosetae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae sparsely but evenly distributed, longer than shorter spur, shorter than longer spur, shorter spur 0.57-0.75 ([0.61] mean 0.63) X length of longer spur, longer spur almost

straight, 0.57-0.74 ([0.65] mean 0.62) X length of basitarsus; basitarsus with dense microsetae, macrosetae only on posterior margin and shorter than those on tibia, ventral surface with three to four rows of short spines.

Metasoma 1.16-1.53 ([1.32] mean 1.34) X as long as wide. First segment broad and short, slightly constricted at apex, 1.67-2.15 ([1.69] mean 1.82) X as long as wide, 1.96-2.66 ([2.22] mean 2.24) X as long as high, 0.91-1.19 ([1.05] mean 1.01) X as long as T2; tergum, except tergulum, irregular with shallow, moderate to dense, medium punctation, tergulum with moderate fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum with dense coarse punctation, without any distinct median carina. T2 0.77-0.98 ([0.83] mean 0.85) X as long as wide, 1.01-1.12 ([1.09] mean 1.06) X as wide as mesosoma, vestiture subdecumbent to suberect, entirely with sparse, fine to medium punctation, interspaces shiny, increasing in size posteriorly, felt line 0.40-0.56 ([0.49] mean 0.51) X length of tergum, length anterior to felt line 0.60-1.04 ([0.70] mean 0.82) X length of tergum posterior to felt line; S2 convex, setae evenly distributed and shorter than shorter mesotibial spur, anteriorly with moderate, fine to medium punctation, interspaces subequal to puncture diameter, mesal area without carina, posteriorly with sparse fine punctation, interspaces shiny and wider than puncture diameter, felt line absent. S3-S6 with setae clumped, erect and longer than smaller mesotibial spur. Pygidium transverse, posterior margin slightly convex, anterior one-third sparsely punctate, interspaces smooth and wider than puncture diameter, pygidial plate entirely smooth, except lateral and posterior margin finely punctured; hypopygium with posterior margin shallowly concave, mesal area simple. Genitalia as in fig. 59.

FEMALE: Unknown.

Lectotype (*T. imbellis*): ♂, "Nlle Galles / du Sud" [André's handwriting]; "MUSEUM PARIS / COLLECTION / ERNEST ANDRÉ / 1914"; "TYPE"; "LECTOTYPE / Mutilla (Sphaeropthalma) / imbellis André 1895 ♂ / det. D.J. Brothers 1981"; LECTOTYPE" (1♂, MNHN).

MATERIAL EXAMINED

TYPE MATERIAL. Lectotype (*M. semele*): ♂, "[SOUTH AFRICA:] Van Wyk / Vley [32°07'S 19°43'E] // E. Alston / Feb[ruar]y. [18]85" [Péringuey's handwriting]; "36"; "Mutilla / Semele [*sic*]. / typ[e]. ♂ Py"; "TYPE"; "LECTOTYPE / Mutilla / semele ♂ / Péringuey 1898 / det. D.J. Brothers, 1982" (1♂, SAMC).

Paralectotype (*M. semele*): 3♂: SOUTH AFRICA: [1]Van Wyk Vley, 32°07'S 19°43'E, ii.1885 (E.

Alston, 36, 278) SAM-HYM-AO18414, *det.* by Hesse as *Tricholabiodes semele* Pér, *designated & det.* by Brothers as PARALECTOTYPE *Mutilla semele* ♂ Péringuey 1898 (1♂, SAMC); [2]Van Wyk Vley, 32°07'S 19°43'E, ii.1885 (E. Alston) SAM-HYM-AO18414, *det.* by Péringuey as *Dasylabroides semele*, *designated & det.* by Brothers as PARALECTOTYPE *Mutilla semele* ♂ Péringuey 1898 (1♂, SAMC); [3]Van Wyk's Vley, 32°07'S 19°43'E, 11.xi.1885 (E.G. Alston) SAM-HYM-AO18415, *det.* by Péringuey as *Dasylabroides semele* P. sec. typ., *designated & det.* by Brothers as PARALECTOTYPE *Mutilla semele* ♂ Péringuey 1898 (1♂, SAMC).

MEASURED MATERIAL. 19♂: NAMIBIA: [15]Etosha Nat. Park, Okaukuejo, 19°10'S 15°54'E, vi.1991 (W. Versfeld) (1♂, SMWH); [11]Welwitschia, 13 mi. SE., 800 m, 20°22'S 14°58'E, 22.xii.1966 (E.S. Ross & K. Lorenzen) (1♂, CASC); [1, 2]Outjo, Huab 261, 20°55'S 13°27'E, 29.xi.1972 (H10997) (2♂, SMWH); [9]Karibib, 21°59'S 15°51'E, ii.1978 (C. Kok & S.J. v. Tonder) (1♂, NCSA); [12]Kalkfontein, 22°08'S 20°53'E, v.1922 (J.S. Brown) (1♂, SAMC); [3]Windhoek Dist., 110 km E. Windhoek, Arnhem Farm No. 222, 22°41'S 18°08'E, 25.x.1972 (C.L. Hogue) (1♂, UCRC); [4, 5]Windhoek District, Christirina 259, Nouas, 23°25'S 18°03'E, 21.xi.1989 (C.S. Roberts) (2♂, SMWH); [8]Maltahöhe Dist., Blässkrans 7 at:, 24°06'05"S 16°14'05"E, 12-14.x.1984 (J. Irish) (1♂, SMWH); [19]Mariental, 60 km S., 24°40'S 17°59'E, 2.ii.1995 (P.S. Bayliss) light trap (1♂, BSCA); [16]Huams Riv. Bed, 25°37'S 17°01'E, 31.i.1969 (B. Lamoral) (1♂, DJBC); [10]Bethanie, Neisip 34, 26°25'S 17°05'E, 19-21.x.1970 (H2570) (1♂, SMWH); [17]Keetmanshoop, Wildheim Ost 384, 26°35'S 18°10'E, 23-29.x.1975 (S. Louw & M-L. Penrith, H33507) (1♂, SMWH); [6, 7]Kiries West, 26°35'S 18°57'E, xii.1925 (J.S. Brown) *det.* as *T. semele* Pér. (1♂) (2♂, SAMC) [18]Warsbad, Ortmansbaum 120, 28°18'S 18°42'E, 18-21.x.1971 (H4694) (1♂, SMWH). SOUTH AFRICA: [13]Kalahari, Molupo River, 7-8.x.1955 (B.P. Ivanov, B.M. 1955-754) (1♂, NHML); [14]Beaufort West, 32°21'S 22°35'E, ii.1958 (1♂, SAMC).

ADDITIONAL MATERIAL. 54♂: NAMIBIA: Outjo, Bethanis 514, 20°08'S 16°08'E, 8-10.v.1973 (H12737) (1♂, SMWH); Welwitschia, 13 mi. SE., 800m, 20°22'S 14°58'E, 22.xii.1966 (E.S. Ross & K. Lorenzen) (3♂, CASC); Kalkfontein, 22°08'S 20°53'E, x.1923 (J.S. Brown) (2♂, SAMC), iii.1924 (J.S. Brown) *det.* as *T. semele* Pér. (1♂, SAMC); Windhoek District., 110 km E. Windhoek, Arnhem Farm No. 222, 22°41'S 18°08'E, 25.x.1972 (C.L. Hogue) (2♂, UCRC); Windhoek District, Christirina 259, Nouas, 23°25'S 18°03'E, 21.xi.1989 (C.S. Roberts) (4♂, SMWH); Maltahöhe Dist., Blässkranz 7 at:, 24°06'05"S 16°14'05"E, 12-14.x.1984 (J. Irish) (1♂, SMWH); Mariental, 60 km S., 24°40'S 17°59'E, 2.ii.1995 (P.S. Bayliss) light trap (2♂, SMWH); Huams Riv. Bed, 25°37'S 17°01'E, 31.i.1969 (B. Lamoral) (1♂, DJBC); Asab, 25°47'S 19°40'E, 1924 (J.S. Brown) (1♂, SMWH), *det.* as *T. semele* Pér. (2♂, SMWH); Helmeringhausen (13), 25 mls. W., Barby Farm, 25°55'S 16°50'E, 17-18.i.1972

(Southern African Exp., B.M. 1972-1) (1♂, NHML); TSES, 25°58'S 18°08'E, 1924 (J.S. Brown) (2♂, SMWH), *det.* as *T. semele* Pér. (1♂, SMWH); Keetmanshoop, Wildheim Ost 384, 26°35'S 18°10'E, 23-29.x.1975 (S. Louw & M-L. Penrith, H33507) (1♂, SMWH); Kiries West, 26°35'S 18°57'E, x.1925 (J.S. Brown) (14♂, SAMC); Ortmansbaus 120, 28°18'S 18°42'E, 18-21.x.1971 (H4693) (2♂, SMWH); Koakoveld, Warmbad, 28°27'S 18°44'E, ii.1925 (Mus. Exped.) (1♂, SAMC). SOUTH AFRICA: Kalahari, Molupo River, 7-8.x.1955 (B.P. Ivanov, B.M. 1955-754) (2♂, NHML); Kalahari Gemsbok Nat. Park, Twee Rivieren, 26°25'S 20°37'E, 13.ii.1988 (G.D. Butler) (1♂, NCSA); Northern Cape Pr., Kuruman, 27°27'S 24°16'E, 3.i.1977 (Empey) *det.* by Brothers as *T. semele* Péringuey (1♂, DJBC); Kimberley, 28°45'S 24°47'E, 1913 (Power) (1♂, SAMC), 1923 (Power) (1♂, SAMC); C.P., Groblershoop, 28°53'S 21°59'E, iv.1982 (C.G.E. Moolman) (1♂, NCSA); Karas, E., 30°27'S 18°08'E, vii.1936 (mus. staff) (1♂, SAMC); Beaufort West, 32°21'S 22°35'E, ii.1958 (3♂, SAMC); Cape Province, Prince Albert Rd, 33°15'S 22°03'E, 26.xi-4.xii.1931 (R.E. Turner, Brit. Mus 1932-3) (1♂, NHML).

DISTRIBUTION

This species occurs in southern Africa, with specimens recorded from central and southern Namibia and western South Africa (fig. 78).

DISCUSSION

André's (1895) description is based on at least two males, since he included the size range of *T. imbellis*. André did not designate a holotype. Brothers (1983) studied two conspecific male specimens attributed to this species in the Paris Museum. Neither of the specimens bore determination labels but had the labels placed above the specimens in the box. Brothers noted that these specimens fitted the description of *T. imbellis* very well, bore similar appropriate locality labels and thus are obviously the syntypes. Brothers designated the larger and better preserved specimen as the lectotype. Furthermore, Brothers is of the opinion that the locality of *T. imbellis* was incorrectly given as Australia, instead of the Western Cape. These specimens, according to Brothers (1983) show characters typical of the nocturnal mutillids found in the deserts of the Mediterranean and southern African regions. This idea is reinforced by the fact that the locality labels of these specimens were written by André, without any indication of collector or date.

Péringuey's (1898) description of *T. semele*, "[Male] ... 8-11 mm ... Cape Colony (Carnarvon)", is based on at least two specimens. There is a single specimen (in the SAMC) with Péringuey's type label and appropriate collecting data (Van Wyksvlei is northwest of Carnarvon). There are another three

specimens (also in the SAMC) with identical collecting data, two with Péringuey's determination labels (although as *Dasylabroides semele*) and one with a determination label by Hesse; a further specimen (from "Wyk's Vly, 11.11.[18]85, E.G. Alston" and headless) has Péringuey's determination label (as *Dasylabroides semele* "sec. typ."). Brothers (MS) considered these specimens to be syntypes and designated the one with Péringuey's type label as the lectotype. The other specimens have been labelled as paralectotypes; the smallest (one of those determined by Péringuey) is not conspecific with the others and is identified here as *T. nodosus*.

André (1901) in redescribing *T. semele*, corrected Péringuey's (1898) description. André based his redescription on a headless male which I have seen "LE CAP ... *Mutilla / semele* ♂ Pér ... [*det.* by] Péringuey". This specimen is identical to the lectotype and three of the four paralectotypes of *T. semele*. Bischoff (1920) did not completely redescribe *T. semele*, but added additional characters that had been overlooked by Péringuey (1898).

Brothers (1983) noted that *T. semele* is conspecific with, thus a junior synonym of, *T. imbellis*. It was not possible to study the lectotype of *T. imbellis*, but comparison of photographs (taken by Professor D. J. Brothers) of the lectotype, with the syntype series of *T. semele*, indicates that all specimens, except the paralectotype of *T. semele* identified here as *T. nodosus*, are conspecific.

This species is most closely related to *T. petiolatus* from which it differs in the length of the macrosetae on the mesotibia, absence of macrosetae on the metabasitarsus, arrangement of setae on S3-S6 and the genitalia (figs 59 & 62), in particular, the shape of the parameres. In *T. imbellis*, the mesotibia has the macrosetae longer than the shorter spur, the macrosetae on the metabasitarsus are absent and S3-S6 has setae clumped, erect and longer than smaller mesotibial spur. In *T. petiolatus*, the mesotibia has the macrosetae shorter than the shorter spur, the macrosetae on the metabasitarsus are present and S3-S6 has subequal amounts of flat and erect setae.

***Tricholabiodes marmaricus* Invrea, 1932a. ♂**

Tricholabioides [*sic*] *marmarica* [*sic*] Invrea, 1932a:67. ♂

[*Tricholabioides* [*sic*]] *marmarica* [*sic*] [Invrea]; Suárez, 1977:218. ♂

[*Tricholabioides* [*sic*]] *marmarica* [*sic*] Invrea; Suárez, 1990:182, 186. ♂

The mesosoma of the holotype is damaged, so it is impossible to calculate an accurate width measurement. Ratios that include a mesosoma width measurement, only have a range and mean value given.

DIAGNOSIS

MALE: Metasoma with T1 entirely medium reddish-brown, T2-T6 dark reddish-brown to black, becoming paler posteriorly, sterna paler than corresponding terga. Head with sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Free border of clypeus with mesal area arched, arch broadly notched forming a triangulate protuberance on each side of midline. Middle and inner mandibular teeth separated by distance half of width of apical tooth. Mesosoma broad, one-fifth wider than head. Mesoscutum with posterolateral corner flat. Mesepisternum with scrobe a distinct subcircular depression, mesepisternal groove absent. Mesosternum simple, no mesosternal processes. Second submarginal cell sessile anteriorly. Mesobasitarsus curved slightly ventrally. Metacoxa medial margin with a short triangular protuberance about 0.20 X length of coxa. Metasoma with 1st segment posteriorly broad and dorsoventrally thickened; S1 with medial carina absent; S2 without felt line. Pygidium anterior one-third irregular and moderately punctate, interspaces subequal to puncture diameter, pygidial plate anteriorly smooth although surface slightly irregular, posteriorly densely and finely punctate; hypopygium with posterior margin rounded, mesal area with longitudinal depression < 0.5 X length of sternum. Genitalia as in fig. 30.

REDESCRIPTION

MALE: Length 12.89 (12.75-14.08, mean 13.37) mm. Head dark reddish-brown, between ocelli black; clypeus and antenna pale yellowish-brown; mandibles almost entirely pale yellowish-brown, apex dark reddish-black, ventral tooth medium reddish-black; mesosoma medium yellowish-brown, propodeum dark yellowish-brown; legs, including coxae, medium reddish-brown with tibial spurs pale yellowish-brown; forewing darkly infuscated posterior to marginal cell; pterostigma pale reddish-black; wing veins pale yellowish-brown; metasoma with T1 entirely medium reddish-brown, segments T2-T6 dark reddish-brown to black, becoming paler posteriorly, sterna paler than corresponding terga; entire body covered with long, pallid setae.

Head 1.49 (1.43-1.55, mean 1.49) X as wide as long, 0.78-0.82 (mean 0.79) X as wide as mesosoma, 1.37 (1.37-1.53, mean 1.51) X as wide as vertex, 1.48 (1.48-1.60, mean 1.53) X as long as compound eye, sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with sparse fine punctation, interspaces shiny and wider than puncture

diameter; foveola deep; surface between median ocellus and foveola with longitudinal median groove, sides tapering anteriorly, between toruli longitudinal median groove v-shape in section and deep; scrobal carina absent; antennal tubercle simple, with sparse fine punctation. Vertex 0.66 (0.64-0.77, mean 0.71) X as long as wide, 1.20 (1.08-1.25, mean 1.15) X as wide as frons; posterior to lateral ocellus with sparse fine punctation, interspaces shiny and wider than puncture diameter. Compound eye with ommatidia indistinct. Ocelli large, convex and broadly oval, median ocellus 0.83 (0.85-0.98, mean 0.89) X as long as wide, interocellar distance 1.31 (1.31-1.57, mean 1.51) X ocellocular distance. Gena with moderate medium punctation, interspaces anteriorly irregular, posteriorly shiny. Clypeus 0.37 (0.35-0.38, mean 0.37) X as high as wide, free border with mesal area arched, arch broadly notched forming a triangulate protuberance on each side of midline; central portion raised and slightly convex, sparsely and finely punctate, interspaces 3 X puncture diameter; vestiture length longer than height of clypeus. Mandible higher than thick, dorsal rim with carina along entire length of mandible, ending at base of inner tooth; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth separated by distance half of width of apical tooth, inner tooth rounded; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 0.89 (0.91-0.98, mean 0.93) X height at base. Antenna with scape 1.74 (1.57-1.74, mean 1.64) X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere simple; second flagellomere 1.33 (1.24-1.36, mean 1.30) X length of first, 1.00 (1.00-1.06, mean 1.04) X length of third.

Mesosoma broad, excluding anterior collar, 1.45-1.53 (mean 1.50) X as long as wide. Pronotum 0.88-0.91 (mean 0.89) X as wide as mesosoma, anterodorsal surface irregular with moderate medium punctation mesally becoming pit-like, shallow reticulations laterally, slightly convex, humeral angle subrounded; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct and almost as large as a reticulation; posterior portion of lateral surface with sparse fine punctation, interspaces irregular and wider than puncture diameter, posterior margin impunctate. Mesoscutum 0.80 (0.74-0.79, mean 0.76) X as long as wide, 0.86 (0.86-0.91, mean 0.88) X as wide as pronotum; between notauli with sparse medium punctation, interspaces smooth and wider than puncture diameter; laterally with moderate medium punctation, posterolaterally with dense coarse punctation; posterolateral corner flat. Scutellum subsquare, entire dorsal surface moderately covered with coarse subcircular punctation. Dorsellum with dense medium punctation, laterally simple, although edges of lateral punctures may give the impression that dorsellum is laterally ridged. Propodeum with areola same length as neighbouring areae. Mesepisternum with pit-like, shallow reticulations, reticulations approximately same size as those on anterior portion of lateral surface of pronotum, scrobe a distinct subcircular depression, mesepisternal

groove absent. Mesosternum with anterior concavity nearly impunctate, shiny, posteriorly becoming moderately punctate, punctures medium and ill-defined; no mesosternal processes.

Forewing: Pterostigma 0.75 (0.71-0.86, mean 0.78) X length of anterior margin of marginal cell. Marginal cell 3.09 (2.95-3.35, mean 3.18) X as long as wide, 1.30 (1.30-1.64, mean 1.56) X length of second submarginal. Second submarginal cell sessile anteriorly, 0.50 (0.44-0.50, mean 0.48) X length of discoidal cell. Third submarginal cell with vein 3r-m tubular anterior to junction with accessory vein, absent posterior to junction with accessory vein; medial vein spectral; accessory vein anteriorly tubular, posteriorly nebulous, 0.9 X length of marginal cell.

Legs. Mid leg: Coxa unarmed; femur simple with greatest width at midlength; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.71 (0.69-0.76, mean 0.73) X length of longer spur, longer spur almost straight; basitarsus curved slightly ventrally. Hind leg: Coxa entirely with sparse punctation, interspaces wider than puncture diameter, mesal margin with short triangular protuberance about 0.20 X length of coxa, ventral surface convex; trochanter simple; femur simple with macrosetae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae sparsely but evenly distributed, shorter than shorter spur, shorter spur 0.66 (0.65-0.68, mean 0.67) X length of longer spur, longer spur almost straight, 0.81 (0.63-0.81, mean 0.68) X length of basitarsus; basitarsus with dense microsetae, macrosetae sparse, only on posterior surface and shorter than those on tibia, ventral surface with two rows of short, often indistinct, spines.

Metasoma 1.20 (1.13-1.33, mean 1.21) X as long as wide. First segment posteriorly broad and slightly constricted at apex, dorsoventrally thickened and fairly long, 2.18 (1.90-2.09, mean 1.98) X as long as wide, 3.20 (2.95-3.03, mean 2.99) X as long as high, 0.97 (0.92-1.04, mean 0.97) X as long as T2; tergum, except tergulum, with moderate medium punctation, tergulum with sparse to medium, fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum densely covered with coarse punctures, anterior one-third with slight median carina. T2 0.91 (0.85-0.94, mean 0.90) X as long as wide, 0.97-1.05 (mean 1.01) X as wide as mesosoma, vestiture subdecumbent to suberect, anterior one-third with moderate coarse punctation, interspaces shiny and subequal to puncture diameter, posterior two-thirds shallowly and sparsely punctate, interspaces shiny and wider than puncture diameter, felt line 0.48 (0.45-0.53, mean 0.49) X length of tergum, length anterior to felt line 0.96 (0.78-0.97, mean 0.90) X length of tergum posterior to felt line; sternum simple, convex, with setae evenly distributed and shorter than shorter mesotibial spur, anteriorly with moderate medium punctation, interspaces smooth and subequal to puncture diameter, mesal area

without carina, posteriorly with sparse medium punctation, interspaces shiny and subequal to puncture diameter, felt line absent. Pygidium transverse, posterior margin convex, anterior one-third irregular with moderate punctation, interspaces subequal to puncture diameter, pygidial plate anteriorly smooth although surface slightly irregular, posteriorly with dense fine punctation; hypopygium with posterior margin convex, mesal area with longitudinal depression > 0.5 X length of sternum. Genitalia as in fig. 30.

FEMALE: Unknown.

MATERIAL EXAMINED

TYPE MATERIAL. Holotype: ♂, "[LIBYA]: Cyrenaica [19]15. / R.U. Agrario viii. / Porto Bardia [= Locality not known] / Geo C. Krüger"; "*Pseudopho - / topsis* spec."; "TYPUS"; "*Tricholabioides* [*sic*] / *marmarica* [*sic*] / Typus Invrea / Determ.[ine] F. Invrea" (MCSN).

MEASURED MATERIAL. 4♂: TUNISIA: [1]Kairouan, 35°40'28"N 10°06'06"E (Santschi) (1♂, MNHN); [3]Maknassy, 34°37'N 9°36'E, 1927 (C. Dumont) *det.* by Suárez as *Tricholabiodes. marmaricus* Invr. (1♂, MNHN); [2]Bou Hedma, 34°37'N 9°35'E, vi.1929 (C. Dumont) (1♂, MNCN). LIBYA: [4]Wadi Dinar, 31°50'25"N 14°07'14"E, vi.1939 (G.O. Kruger) *det.*by Invrea as *Tricholabiodes marmarica* Invr. (1♂, MNCN).

ADDITIONAL MATERIAL. 2♂: TUNISIA: Kairouan, 35°40'28"N 10°06'06"E (Santschi) *det.* as *Tricholabiodes* (1♂, MNHN); Bou Hedma, 34°29'N 9°35'E, vi.1929 (C. Dumont) (1♂, MNCN).

DISTRIBUTION

This species occurs in the northernmost part of North Africa, with specimens recorded from Tunisia and Libya (fig. 79).

DISCUSSION

Invrea (1932a) described this species from a single specimen, caught by C Krüger. The description is thorough, accurately describing the holotype. Suárez (1977, 1990), although he made reference twice to *T. marmaricus*, including a drawing of the genitalia (Suárez 1990), never redescribed this species.

This species is most similar to *T. nonveilleri*. *Tricholabiodes marmaricus* can be separated from *T. nonveilleri* by the width of the mesosoma, sculpturing of the posterolateral corner of the mesoscutum,

shape of the protuberance on the mesal margin of the metacoxa, and the absence of a longitudinal carina on the anterior mesal area of S2. In *T. marmaricus*, the mesosoma is one-fifth wider than the head, the posterolateral corner of the mesoscutum is flat, the mesal margin of the metacoxa has a short triangular protuberance and the anterior mesal carina of S2 is absent. In *T. nonveilleri*, the mesosoma is less than one-fifth wider than the head, the posterolateral corner of the mesoscutum is raised, the mesal margin of the metacoxa has a large dentiform flange and the anterior mesal area of S2 has a short elongate protuberance.

***Tricholabiodes bactrianus* Suárez, 1967. ♂**

Tricholabioides [*sic*] *bactrianus* Suárez, 1967:565. ♂
Tricholabiodes bactrianus Suárez; Lelej & Kabakov, 1980:186, 187. ♂
Tricholabiodes bactrianus Suárez; Lelej & Kabakov, 1981:146, 147. ♂
Tricholabiodes bactrianus Suárez; Lelej, 1985:151, 152. ♂
[*Tricholabioides* [*sic*]] *bactrianus* Suárez; Suárez, 1990:184, 186, fig. 31. ♂

DIAGNOSIS

MALE: Metasoma with T1 segment entirely medium yellowish-brown, T2-T6 dark reddish-brown, becoming dark yellowish-brown posteriorly, sterna paler than corresponding terga. Head with sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Free border of clypeus strongly convex with a rounded tubercle on each side of midline. Middle and inner mandibular teeth adjacent, inner tooth subrounded. Dorsellum with dense medium punctation, laterally simple. Mesepisternum with mesepisternal groove present; no mesosternal processes. Mesal margin of metacoxa simple; metafemur with macrosetae usually longer than longer tibial spur, sometimes macrosetae shorter than longer tibial spur. Metasoma with T2 entirely with sparse, fine to medium punctation, punctures becoming less dense and smaller posteriorly; sternum with mesal area simple, felt line absent. Pygidium with pygidial plate entirely with medium fine punctation; hypopygium with mesal area simple. Genitalia as in fig. 47.

REDESCRIPTION

MALE: Length 10.76 mm. Head, including clypeus, medium yellowish-brown, antenna pale yellowish-brown; mandible almost entirely pale yellowish-brown, apex black, ventral tooth pale reddish-black; mesosoma medium yellowish-brown; legs, including coxae and tibial spurs, golden yellow; forewing

lightly infuscated posterior to pterostigma; pterostigma and wing veins golden yellow; metasoma with T1 entirely medium yellowish-brown, T2-T6 dark reddish-brown, becoming paler posteriorly, sterna paler than corresponding terga; entire body covered with long, pallid setae.

Head 1.58 X as wide as long, 0.94 X as wide as mesosoma, 1.53 X as wide as vertex, 1.33 X as long as compound eye, sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with sparse fine punctation, interspaces shiny and wider than puncture diameter; foveola deep; surface between median ocellus and foveola smooth, without longitudinal median groove, between toruli longitudinal median groove subrounded in section and shallow; scrobal carina arcuate, not reaching scrobal tubercle; antennal tubercle simple, with sparse fine punctation. Vertex 0.59 X as long as wide, 1.38 X as wide as frons; posterior to lateral ocellus with sparse fine punctation, interspaces shiny and subequal to puncture diameter. Compound eye with ommatidia distinct. Ocelli large, convex and broadly oval, median ocellus 0.89 X as long as wide, interocellar distance 1.78 X ocellocular distance. Gena with sparse fine punctation, interspaces shiny. Clypeus 0.33 X as high as wide, free border strongly convex with a rounded tubercle on each side of midline; central portion raised and slightly convex, sparsely and finely punctate, interspaces 3 X puncture diameter; vestiture length longer than height of clypeus. Mandible higher than thick, dorsal rim with carina along entire length, ending at base of inner tooth; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth adjacent, inner tooth subrounded; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 0.87 X height at base. Antenna scape 2.23 X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere simple; second flagellomere 1.54 X length of first, 1.08 X length of third.

Mesosoma, excluding anterior collar, 1.59 X as long as wide. Pronotum 0.89 X as wide as mesosoma, anterodorsal surface with ill-defined punctation mesally becoming pit-like shallow reticulations laterally, strongly convex, humeral angle subrounded; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct and almost as large as a reticulation; posterior portion of lateral surface roughly striated, posterior margin impunctate. Mesoscutum 0.86 X as long as wide, 0.85 X as wide as pronotum; between notauli with moderate medium punctation, interspaces smooth and subequal to puncture diameter, laterally with moderate, fine to medium punctation, posterolaterally with dense shallow punctation; posterolateral corners raised as an angulate tooth. Scutellum subtrapezoidal, posteriorly convergent, entire dorsal surface densely covered with coarse subcircular punctation. Dorsellum with dense medium punctation, laterally simple. Propodeum with areola same length as

neighbouring areae. Mesepisternum with pit-like, shallow reticulations, approximately 1.25 X > those on anterior portion of lateral surface of pronotum, scrobe a distinct subcircular depression, mesepisternal groove present, reticulations in groove twice as long as wide. Mesosternum with anterior concavity transversely ridged, posteriorly with sparse punctation, punctures fine and ill-defined; no mesosternal processes.

Forewing: Pterostigma 0.47 X length of anterior margin of marginal cell. Marginal cell 3.45 X as long as wide, 1.55 X length of second submarginal. Second submarginal cell sessile anteriorly, 0.45 X length of discoidal cell. Third submarginal cell with vein 3r-m tubular anterior to junction with accessory vein, nebulous becoming spectral posterior to junction with accessory vein; medial vein spectral; accessory vein nebulous, 1.15 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur simple with greatest width at midlength; tibia simple with macrosetae longer than shorter spur, sometimes macrosetae longer than longer spur, shorter spur 0.81 X length of longer spur, longer spur almost straight; basitarsus straight. Hind leg: Coxa entirely with moderate medium punctation, interspaces subequal to puncture diameter, mesal margin simple, ventral surface convex; trochanter simple; femur with macrosetae evenly distributed, all subequal in length, longer than longer tibial spur, sometimes macrosetae shorter than longer tibial spur; tibial macrosetae sparsely but evenly distributed, majority of macrosetae longer than longer spur, shorter spur 0.72 X length of longer spur, longer spur almost straight, 0.67 X length of basitarsus; basitarsus with dense microsetae, macrosetae on posterior surface, ventral surface with two rows short spines.

Metasoma 1.17 X as long as wide. First segment moderately wide and slightly constricted at apex, 2.40 X as long as wide, 2.83 X as long as high, 0.95 X as long as T2; tergum, except tergulum, irregular with moderate to coarse, medium punctation, tergulum with moderate fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum with dense coarse punctation, mesal area with no distinct carina. T2 0.98 X as long as wide, 0.99 X as wide as mesosoma, vestiture subdecumbent to suberect, entirely with sparse, fine to medium punctation, punctures becoming less dense and smaller posteriorly, felt line 0.40 X length of tergum, length anterior to felt line 1.15 X length to tergum posterior to felt line; S2 convex, setae evenly distributed and shorter than shorter mesotibial spur, entirely with sparse to moderate and fine to medium punctation, mesal area simple, felt line absent. Pygidium with posterior margin convex, anterior one-third moderately punctate, interspaces shiny and subequal to puncture diameter, pygidial plate entirely with moderate fine punctation; hypopygium with posterior margin convex, mesal area simple. Genitalia as in fig. 47.

FEMALE: Unknown.

Holotype: ♂, "Askabad [= Ashgabat; 37°57'N 58°23'E] (Turkmenistan), sin más datos" (MNCN?).

MATERIAL EXAMINED

MEASURED MATERIAL. 1♂: TURKMENISTAN: Kum-Dag, 15 km S.E., 39°14'N 54°33'E, 14.vii.1953 (Odintsova) *det.* by Lelej as *Tricholabiodes bactrianus* Suárez (1♂, IBPV) [label information handwritten, transliterated from Russian].

DISTRIBUTION

This species occurs in southwestern Asia, with specimens recorded from Turkmenistan (Suárez 1967; Lelej & Kabakov 1980, 1981; Suárez 1990) and Iran (Lelej & Kabakov 1980, 1981; Suárez 1990) (fig. 80).

DISCUSSION

Suárez (1967) described this species from a single specimen which has only the locality information recorded on the specimen label. Lelej & Kabakov (1980, 1981), Lelej (1985) and Suárez (1990) make superficial reference to this species, with both Lelej and Suárez including it in a key. The drawing of the genitalia by Suárez (1990) is actually of *T. brothersi*.

The holotype was not been studied. According to Suárez (1967) the holotype should be in the "...Instituto Español de Entomologia de Madrid". Correspondence with Dr I. Izquierdo (curator at Museo Nacional De Ciencias Naturales, Madrid, Spain) indicated that the holotype should be housed in the museum, but cannot be found and there is no previous record of it been loaned out.

This species is most closely related to *T. pallidus* from which it differs mainly in the shape of the free border of the clypeus, relative position of the middle and inner mandibular tooth, presence of the mesepisternal groove, sculpturing on the mesal margin of the metacoxa, length of the macrosetae of the metafemur, and the genitalia (figs 38 & 47). In *T. bactrianus*, the free border of the clypeus is strongly convex with a rounded tubercle on each side of the midline, the middle and inner mandibular teeth are adjacent, the mesepisternal groove is present, the mesal margin of the metacoxa is simple and the metafemur has the macrosetae longer than the longer tibial spur. In *T. pallidus*, the free border of the clypeus is strongly convex with a weak protuberance on each side of the midline, the middle and inner mandibular teeth are separated by a distance subequal to width of the apical tooth, the mesepisternal

groove is absent, the mesal margin of the metacoxa has a slight protuberance ending apically with a weakly sclerotised denticle and the metafemur has macrosetae shorter than the shorter tibial spur.

***Tricholabiodes recurvatus* sp. nov. ♂**

DIAGNOSIS

MALE: Metasoma with T1 and T2 entirely medium yellowish-brown, T3-T6 pale to medium reddish-black. Head with sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Free border of clypeus with mesal area slightly protruding in a weak subrounded arch, arch mesally notched forming a weak denticle on each side of midline. Middle and inner mandibular teeth separated by distance half width of apical tooth, inner tooth truncate. Mesepisternum with scrobe present, mesepisternal groove absent; no mesosternal process. Mesal margin of metacoxa with arched protruding ridge, < 0.5 X length of coxa; tibia with macrosetae mostly on posterior surface with several setae anteriorly, setae longer than longer spur. Metasoma with anterior one-third of T2 with dense coarse punctation, at base might appear reticulate because of the density of the punctures; anterior mesal area of S2 without carina, S2 without felt line. Pygidium with pygidial plate entirely with dense fine punctation, except anterolateral margin smooth; hypopygium with mesal area simple. Genitalia as in fig. 31.

DESCRIPTION

MALE: Length 10.46 mm. Head, including clypeus and antenna, medium yellowish-brown; mandible almost entirely pale yellowish-brown, apex black, ventral tooth pale reddish-black; mesosoma medium yellowish-brown; legs, including coxae and tibial spurs, pale yellowish-brown; forewing lightly infuscated posterior to marginal cell; pterostigma and wing veins pale yellowish-brown; metasoma with T1 and T2 entirely medium yellowish-brown, S3-S6 pale to medium reddish-black; entire body covered with long, pallid setae.

Head 1.46 X as wide as long, 0.94 X as wide as mesosoma, 1.46 X as wide as vertex, 1.38 X as long as compound eye, sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with sparse fine punctation, interspaces shiny and wider than puncture diameter; foveola deep; surface between median ocellus and foveola without longitudinal median groove though slightly longitudinally depressed, between toruli longitudinal median groove subrounded in section and shallow; scrobal carina arcuate, extending almost to scrobal tubercle; antennal

tubercle simple, with sparse fine punctation. Vertex 0.65 X as long as wide, 1.38 X as wide as frons; posterior to lateral ocellus with sparse fine punctation, interspaces shiny and subequal to puncture diameter. Compound eye with ommatidia distinct. Ocelli large, convex and broadly oval, median ocellus 0.77 X as long as wide, interocellar distance 1.79 X ocellocular distance. Gena with sparse medium punctation, interspaces irregular. Clypeus 0.36 X as high as wide, free border with mesal area slightly protruding in a weak subrounded arch, arch mesally notched forming a weak denticle on each side of midline; central portion raised and slightly convex, with sparse fine punctation, interspaces 4-5 X puncture diameter; vestiture length longer than height of clypeus. Mandible higher than thick, dorsal rim with carina along entire length, ending at junction between middle and inner tooth; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth separated by distance half width of apical tooth, inner tooth truncate; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 0.91 X height at base. Antenna with scape 2.31 X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere simple; second flagellomere 1.61 X length of first, 1.04 X length of third.

Mesosoma, excluding anterior collar, 1.61 X as long as wide. Pronotum 0.92 X as wide as mesosoma, anterodorsal surface mesally with dense medium ill-defined punctation, becoming pit-like shallow reticulations laterally, strongly convex, humeral angle subrounded; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct and almost as large as a reticulation; posterior portion of lateral surface slightly roughly punctate, posterior margin impunctate. Mesoscutum 0.84 X as long as wide, 0.84 X as wide as pronotum; entirely with moderate medium punctation, interspaces smooth and subequal to puncture diameter, posterolaterally with dense coarse punctation; posterolateral corner raised as an angulate tooth. Scutellum subsquare, entire dorsal surface densely covered with coarse subcircular punctation. Dorsellum with dense medium punctation, laterally simple, although edges of lateral punctures may give the impression that dorsellum is laterally ridged. Propodeum with areola longer than neighbouring areae. Mesepisternum, anterior to scrobe with sparse fine punctation becoming shallow pit-like reticulations posteriorly, posterior to scrobe with pit-like, shallow reticulations, reticulations approximately same size as those on anterior portion of lateral surface of pronotum, scrobe a distinct subcircular depression, mesepisternal groove absent. Mesosternum with anterior concavity slightly transversely ridged, posteriorly with moderate, fine to medium ill-defined punctation; no mesosternal processes.

Forewing: Pterostigma 0.35 X length of anterior margin of marginal cell. Marginal cell 4.38 X as long as wide, 1.46 X length of second submarginal. Second submarginal cell sessile anteriorly, 0.49 X length

of discoidal cell. Third submarginal cell with vein 3r-m tubular anterior to junction with accessory vein, nebulous becoming spectral posterior to junction with accessory vein; medial vein spectral; accessory vein anteriorly tubular, posteriorly nebulous, 1.25 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur simple with greatest width at midlength; tibia simple with macrosetae longer than shorter spur, shorter than longer spur, shorter spur 0.84 X length of longer spur, longer spur almost straight; basitarsus straight. Hind leg: Coxa entirely with sparse punctation, interspaces wider than puncture diameter, mesal margin posteriorly with arched slightly protruding ridge, < 0.5 X length of coxa, ventral surface convex; trochanter simple; femur with macrosetae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae mostly on posterior surface with several setae anteriorly, longer than longer spur, shorter spur 0.77 X length of longer spur, longer spur almost straight, 0.70 X length of basitarsus; basitarsus with dense microsetae, macrosetae sparse only on posterior margin and shorter than those on tibia, ventral surface with two, possibly three, short stout spines.

Metasoma 0.89 X as long as wide. First segment fairly long, slightly constricted at apex, 2.06 X as long as wide, 2.81 X as long as high, 0.89 X as long as T2; tergum, except tergulum, with dense coarse subcircular punctation, tergulum with moderate fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum with dense coarse punctation, median carina absent. T2 0.95 X as long as wide, 1.01 X as wide as mesosoma, vestiture subdecumbent to suberect, anterior one-third with dense coarse punctation, at the base punctation might appear reticulate because of density of the punctures, posterior two-thirds with moderate medium punctation, punctures decreasing in density and size posteriorly, interspaces shiny, felt line 0.46 X length of tergum, length anterior to felt line 1.36 X length of tergum posterior to felt line; S2 convex, setae evenly distributed and shorter than shorter mesotibial spur, anteriorly with dense coarse punctation, interspaces narrower than puncture diameter, mesal area without carina, posteriorly with moderate, fine to medium punctation, interspaces shiny and subequal to puncture diameter, felt line absent. Pygidium transverse, posterior margin strongly convex, anterior one-third with moderate to dense punctation, interspaces smooth and subequal to puncture diameter, pygidial plate entirely with dense fine punctation, except anterolateral margin smooth; hypopygium with posterior margin convex, mesal area simple. Genitalia as in fig. 31.

FEMALE: Unknown.

MATERIAL EXAMINED

TYPE MATERIAL. Holotype: ♂, "W. PAKISTAN: / Makran Prov.. 23 / mi. E. of Turbat [26°00'N 63°06'E] / Mar. 8-11.1965 / John W. Neal" (NMNH).

DISTRIBUTION

This species occurs in southwestern Asia, with one specimen seen from Western Pakistan (fig. 80).

DISCUSSION

This species is most similar to *T. pallidicornis* from which it differs in the shape of the free border of the clypeus, shape of the anterodorsal margin of the pronotum and mesobasitarsus, sculpturing on the mesal margin of the metacoxa, and the length and distribution of macrosetae on the metafemur. In *T. recurvatus*, the free border of the clypeus has the mesal margin protruding in a weak arch, which is notched on either side of the midline, forming a weak denticle, the anterodorsal margin of the pronotum is slightly convex, the mesobasitarsus is straight, the mesal margin of the metacoxa has an arched protruding ridge and the macrosetae of the metafemur is evenly distributed and shorter than the shorter tibial spur. In *T. pallidicornis*, the free border of the clypeus has the mesal margin convex, the anterodorsal margin of the pronotum is strongly convex, the mesobasitarsus is slightly anteriorly curved, the mesal margin of the metacoxa is simple and the metafemur has comb-like macrosetae on the ventral surface. The distal setae are longer than the shorter tibial spur.

ETYMOLOGY

"*recurvatus*" (L.), recurved; in reference to the shape of the parameres.

Tricholabiodes garamantis Suárez, 1967. ♂

Tricholabioides [*sic*] *garamantis* Suárez, 1967:563. ♂

[*Tricholabioides* [*sic*]] *garamantis* Suárez; Suárez, 1990:182, 186, fig. 27. ♂

DIAGNOSIS

MALE: Body and appendages almost entirely pale to medium yellowish-brown, T3-T6 darker than T2. Head with sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Free border of clypeus strongly convex with a rounded tubercle on each side. Middle and inner mandibular teeth adjacent, inner tooth acute. Mesepisternum with scrobe present,

mesepisternal groove absent; no mesosternal processes. Mesofemur and tibia simple. Mesal margin of metacoxa with slight, longitudinal carina < 0.5 X length of coxa. Metasoma with median carina of S1 absent. Anterior one-third of T2 with moderate medium punctation, interspaces shiny and subequal to puncture diameter; anterior mesal area of S2 without carina, S2 without felt line. Pygidium with pygidial plate entirely smooth, except lateral and posterior margin finely punctured; posterior margin of hypopygium convex, mesal area simple. Genitalia as in fig. 46.

REDESCRIPTION

MALE: Length 10.82 (7.53-10.82, mean 9.94) mm. Body and appendages almost entirely pale to medium yellowish-brown; except mandible pale yellowish-brown, apex black, ventral tooth pale reddish-black; T3-T6 darker than T2; forewing lightly infuscated posterior to pterostigma; entire body covered with pallid setae.

Head 1.49 (1.46-1.56, mean 1.49) X as wide as long, 0.97 (0.97-1.13, mean 1.07) X as wide as mesosoma, 1.62 (1.58-1.69, mean 1.64) X as wide as vertex, 1.35 (1.26-1.36, mean 1.32) X as long as compound eye, sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with moderate fine punctation, interspaces shiny and wider than puncture diameter; foveola deep; surface between median ocellus and foveola without longitudinal median groove smooth, slightly longitudinally depressed, between toruli longitudinal median groove rounded in section and shallow; scrobal carina arcuate, not reaching scrobal tubercle; antennal tubercle simple, with sparse fine punctation. Vertex 0.66 (0.61-0.76, mean 0.69) X as long as wide, 1.14 (1.14-1.36, mean 1.29) X as wide as frons; posterior to lateral ocellus with sparse fine punctation, interspaces shiny and wider than puncture diameter. Compound eye with ommatidia distinct. Ocelli large, convex and broadly oval, median ocellus 0.88 (0.81-0.88, mean 0.83) X as long as wide, interocellar distance 1.48 (1.32-1.67, mean 1.47) X ocellocular distance. Gena with sparse medium punctation, interspaces irregular. Clypeus 0.37 (0.37-0.43, mean 0.43) X as high as wide, free border strongly convex with a rounded tubercle on each side of midline; central portion raised and slightly convex, sparsely and finely punctate, interspaces 3 X puncture diameter; vestiture length longer than height of clypeus. Mandible higher than thick, dorsal rim with carina along entire length, ending at base of inner tooth; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth apex separated by distance equal to half width of apical tooth, inner tooth subrounded; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 0.86 (0.78-0.97, mean 0.87) X height at base. Antenna with scape 1.81 (1.68-1.98, mean 1.80) X length of first flagellomere, anterior surface with one

longitudinal carina; first flagellomere simple; second flagellomere 1.49 (1.34-1.54, mean 1.46) X length of first, 1.02 (1.02-1.08, mean 1.06) X length of third.

Mesosoma, excluding anterior collar, 1.64 (1.64-1.85, mean 1.75) X as long as wide. Pronotum 0.92 (0.92-0.97, mean 0.94) X as wide as mesosoma, anterodorsal surface with dense ill-defined punctation mesally, becoming pit-like shallow reticulations laterally, strongly convex, humeral angle subrounded; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct and almost as large as a reticulation; posterior portion of lateral surface with sparse fine punctation, interspaces irregular and wider than puncture diameter, posterior margin impunctate. Mesoscutum 0.77 (0.76-0.80, mean 0.78) X as long as wide, 0.85 (0.79-0.86, mean 0.83) X as wide as pronotum; between notauli with sparse to moderate, medium punctation, interspaces smooth and wider than puncture diameter; laterally with sparse to moderate, medium punctation, posterolaterally with dense coarse punctation; posterolateral corner raised as an angulate tooth. Scutellum subsquare, entire dorsal surface densely covered with coarse subcircular punctation. Dorsellum with dense fine punctation, laterally ridged. Propodeum with areola longer than neighbouring areae. Mesepisternum with pit-like, shallow reticulations, 1.5 X > those on anterior portion of lateral surface of pronotum, scrobe a distinct subcircular depression, mesepisternal groove absent. Mesosternum with anterior concavity nearly impunctate, shiny, posteriorly moderately punctate, punctures medium and ill-defined; no mesosternal processes.

Forewing: Pterostigma 0.52 (0.41-0.57, mean 0.49) X length of anterior margin of marginal cell. Marginal cell 4.05 (4.05-4.79, mean 4.46) X as long as wide, 1.69 (1.62-1.85, mean 1.71) X length of second submarginal. Second submarginal cell sessile anteriorly, 0.42 (0.37-0.55, mean 0.48) X length of discoidal cell. Third submarginal cell with vein 3r-m tubular anterior to junction with accessory vein, nebulous becoming spectral posterior to junction with accessory vein; medial vein spectral; accessory vein 1.10 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur simple with greatest width at midlength; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.74 (0.67-0.81, mean 0.74) X length of longer spur, longer spur almost straight; basitarsus straight. Hind leg: Coxa anteriorly with sparse medium punctation, posteriorly becoming moderately to densely punctate, mesal margin simple, ventral surface convex; trochanter simple; femur with macrosetae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae only on posterior surface with several setae anteriorly, shorter than shorter spur, shorter spur 0.67 (0.65-0.78, mean 0.73) X length of longer spur, longer spur almost

straight, 0.73 (0.64-0.73, mean 0.69) X length of basitarsus; basitarsus with dense microsetae, macrosetae absent, ventral surface with several, often indistinct, rows of short spines.

Metasoma 1.20 (1.20-1.66, mean 1.55) X as long as wide. First segment narrow, dorsoventrally broad and fairly long, slightly constricted at apex, 2.35 (2.35-2.77, mean 2.55) X as long as wide, 2.76 (2.75-3.47, mean 2.97) X as long as high, 0.97 (0.95-1.07, mean 1.02) X as long as T2; tergum, except tergulum, with dense coarse subcircular punctation, tergulum with moderate fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum with dense coarse punctation, without any distinct median carina. T2 0.96 (0.94-1.07, mean 1.02) X as long as wide, 1.10 (1.04-1.10, mean 1.06) X as wide as mesosoma, vestiture subdecumbent to suberect, anterior one-third with moderate medium punctation, interspaces shiny and subequal to puncture diameter, posterior two-thirds shallowly and sparsely punctate, interspaces shiny and wider than puncture diameter, felt line 0.59 (0.47-0.59, mean 0.54) X length of tergum, length anterior to felt line 1.01 (0.88-1.69, mean 1.17) X length of tergum posterior to felt line; S2 convex, setae evenly distributed and shorter than shorter mesotibial spur, entirely with sparse to moderate and fine to medium punctation, punctures density and size decreasing posteriorly, anteriorly interspaces irregular, posteriorly interspaces shiny, mesal area without carina, felt line absent. Pygidium slightly transverse, posterior margin convex, anterior one-third irregular and moderately punctate, interspaces subequal to puncture diameter, pygidial plate almost entirely smooth or very lightly punctate, lateral and posterior margin finely punctured; hypopygium with posterior margin convex, mesal area simple. Genitalia as in fig. 46.

FEMALE: Unknown.

MATERIAL EXAMINED

TYPE MATERIAL. Holotype: ♂, "[ALGERIA:] Uan Tézain / Hoggar [23°10'N 5°50'E] - Sah.[ara] Centr.[al] / 29-v [19]51 Mateu Col." (MNCN).

MEASURED MATERIAL. 7♂: NIGER: [1,2]Aïr Massif, Iberkom, 18°55'N 8°40'E, 22.viii.1983 (P.C. Matteson) (2♂, UCDC); [7]Aïr Massif, Wadi Taghmeurt, 18°55'N 8°40'E, 23.viii.1983 (P.C. Matteson) (1♂, UCDC); [3,4]Aïr Massif, Taquei, 18°43'N 8°41'E, 26.viii.1983 (P.C. Matteson) riparian vegetation, light trap (2♂, NHML); [5]Tabello, E. of Aïr, Ifan, 800m, 17°42'N 9°31'E, 23-26.viii.1947 (L. Chopard & A. Villiers) *det.* by Invrea as *Tricholabiodes* (1♂, MNHN). Locality unknown: [6]71 (1♂, MNHN).

ADDITIONAL MATERIAL.32♂: NIGER: Aïr Massif, Illekan, 19°02'N 9°17'E, 19.viii.1983 (P.C.

Matteson) (1♂, UCDC); Aïr Massif, Iberkom, 18°55'N 8°40'E, 22-23.viii.1983 (P.C. Matteson) (15♂, UCDC); Aïr Massif, Wadi Taghmeurt, 18°55'N 8°40'E, 23.viii.1983 (P.C. Matteson) (2♂, UCDC); Aïr Massif, Taquei, 18°43'N 8°41'E, 26.viii.1983 (P.C. Matteson) riparian vegetation, light trap (13♂, NHML). Locality unknown: 71 (1♂, MNHN).

DISTRIBUTION

This species occurs in central North Africa with specimens recorded only from Algeria and Niger (fig. 81).

DISCUSSION

Suárez (1967) described this species from a single specimen collected by Mateu. His description is brief and includes no diagrams. Suárez (1990) includes this species in a catalogue of virtually all described species of the genus, and includes a drawing of the genitalia.

Although *T. garamantis* is a rather uncharacteristic species, it can be unambiguously identified by the combination of characters outlined in the diagnosis. *Tricholabiodes garamantis* is most similar to *T. luridus*. These two species can be separated by the shape of the head behind the compound eyes, shape of the mesobasitarsus, sculpturing on the mesal margin of the metacoxa and the absence of a longitudinal depression on the hypopygium. In *T. garamantis*, the sides of the head behind the compound eyes are slightly convergent posteriorly and gradually merging with a weakly convex posterior margin, the mesobasitarsus is straight, the mesal margin of the metacoxa is simple and the mesal area of the hypopygium is without a longitudinal groove. In *T. luridus*, the sides of the head behind the compound eyes are strongly convergent posteriorly and merging with a weakly convex posterior margin, the mesobasitarsus is strongly ventrally curved, the mesal margin of the metacoxa has a slight longitudinal carina greater than 0.6 X length of the coxa and the hypopygium has a slight longitudinal mesal depression.

***Tricholabiodes tharensis* Lelej, 1995. ♀ & ♂**

Tricholabiodes tharensis Lelej, 1995:10, figs 10, 12, 14. ♀ & ♂

Since the following redescription was generated in the absence of the holotype and only from one specimen, precise measurements are provided only for the paratype studied.

DIAGNOSIS

MALE: Metasoma with T1 entirely medium yellowish-brown, T2-T5 entirely medium yellowish-brown, except for medium reddish-brown band at apex of T2 and base of T3, T6 pale reddish-brown. Head with sides behind compound eyes strongly convergent posteriorly and gradually merging with weakly convex posterior margin. Free border of clypeus with mesal area protruding in a weak arch, arch mesally notched forming a weak, often indistinct, denticle on each side of midline. Middle and inner mandibular teeth separated by distance subequal to width of apical tooth, inner tooth acute. Dorsellum with dense fine punctation, laterally ridged. Mesepisternum with mesepisternal groove absent; no mesosternal processes. Mesal margin of metacoxa with longitudinal carina 0.7 X length of coxa; basitarsus with dense microsetae, macrosetae absent. Metasoma with anterior one-third of T2 with longitudinal rectangular reticulations, with sparse fine punctation within each reticulation; anterior mesal area of S2 with slight carina < 0.5 X length of sternum, S2 with felt line. Pygidium with pygidial plate anteriorly smooth although surface slightly irregular, posteriorly with dense fine punctation; hypopygium mesal area with longitudinal depression < 0.5 X length of sternum. Genitalia as in fig. 32.

REDESCRIPTION

MALE: Length 9.77 mm. Head, including clypeus and antenna, medium yellowish-brown; mandible almost entirely pale yellowish-brown, apex black, ventral tooth pale reddish-black; mesosoma medium yellowish-brown; legs, including coxae and tibial spurs, pale yellowish-brown; forewing lightly infuscated posterior to marginal cell; pterostigma and wing veins golden yellow; metasoma with T1 entirely medium yellowish-brown, T2-T5 entirely medium yellowish-brown, except for medium reddish-brown band at apex of T2 and base of T3, T6 pale reddish-brown; entire body covered with long, pallid setae.

Head 1.50 X as wide as long, 1.05 X as wide as mesosoma, 1.57 X as wide as vertex, 1.30 X as long as compound eye, sides behind compound eyes strongly convergent posteriorly and gradually merging with weakly posterior margin. Frons with sparse fine punctation, interspaces shiny and wider than puncture diameter; foveola deep; surface between median ocellus and foveola smooth, without longitudinal median groove, between toruli longitudinal median groove rounded in section and shallow; scrobal carina arcuate, not reaching scrobal tubercle; antennal tubercle simple, with sparse fine punctation. Vertex 0.62 X as long as wide, 1.33 X as wide as frons; posterior to lateral ocellus with sparse fine punctation, interspaces shiny and subequal to puncture diameter. Compound eye with ommatidia distinct. Ocelli large, convex and broadly oval, median ocellus 0.92 X as long as wide, interocellar distance 1.50 X ocellocular distance. Gena with sparse medium punctation, interspaces

irregular. Clypeus 0.34 X as high as wide, free border with mesal area protruding in a weak arch, arch mesally notched forming a weak, often indistinct denticle on each side of midline; central portion raised and slightly convex, with sparse fine punctation, interspaces 3 X puncture diameter; vestiture length longer than height of clypeus. Mandible higher than thick, dorsal rim with carina along entire length, ending at junction between middle and inner tooth; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth separated by distance subequal to width of apical tooth, inner tooth acute; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 0.81 X height at base. Antenna with scape 2.30 X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere simple, second flagellomere 1.58 X length of first, 1.04 X length of third.

Mesosoma, excluding anterior collar, 1.70 X as long as wide. Pronotum 0.88 X as wide as mesosoma, anterodorsal surface irregular with ill-defined punctation mesally becoming shallow pit-like reticulations laterally, strongly convex, humeral angle subrounded; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct and almost as large as a reticulation; posterior portion of lateral surface with sparse fine punctation, interspaces irregular and wider than puncture diameter, posterior margin impunctate. Mesoscutum 0.85 X as long as wide, 0.84 X as wide as pronotum; between notauli with moderate medium punctation, interspaces smooth and subequal to puncture diameter, laterally with sparse fine punctation, posterolaterally with dense coarse shallow punctation; posterolateral corner raised as an angulate tooth. Scutellum subtrapezoidal, posteriorly convergent, entire dorsal surface densely covered with coarse punctation. Dorsellum with dense fine punctation, laterally ridged. Propodeum with areola longer than neighbouring areae. Mesepisternum with pit-like, shallow reticulations, reticulations approximately same size as those on anterior portion of lateral surface of pronotum, scrobe a distinct subcircular depression, mesepisternal groove absent. Mesosternum with anterior concavity transversely ridged, posteriorly with sparse fine punctation; no mesosternal processes.

Forewing: Pterostigma 0.41 X length of anterior margin of marginal cell. Marginal cell 4.15 X as long as wide, 1.54 X length of second submarginal. Second submarginal cell sessile anteriorly, 0.43 X length of discoidal cell. Third submarginal cell with vein 3r-m tubular anterior to junction with accessory vein, nebulous posterior to junction with accessory vein; medial vein nebulous; accessory vein nebulous, 1.25 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur simple with greatest width at midlength; tibia simple with

macrosetae shorter than shorter spur, shorter spur 0.77 X length of longer spur, longer spur almost straight; basitarsus straight. Hind leg: Coxa entirely with moderate medium punctation, interspaces subequal to puncture diameter, mesal margin with longitudinal carina 0.70 X length of coxa, carina with a slight sclerotised ridge, ventral surface convex; trochanter simple; femur with setae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae sparsely but evenly distributed, shorter than shorter spur, shorter spur 0.70 X length of longer spur, longer spur almost straight, 0.76 X length of basitarsus; basitarsus with dense microsetae, macrosetae absent, ventral surface with two rows short spines.

Metasoma 1.13 X as long as wide. First segment moderately narrow and fairly long, slightly constricted at apex, 2.40 X as long as wide, 3.10 X as long as high, 1.03 X as long as T2; tergum, except tergulum, irregular with dense coarse punctation, tergulum with moderate fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum with dense coarse punctation, median carina continuous. T2 0.99 X as long as wide, 1.03 X as wide as mesosoma, vestiture subdecumbent to suberect, anterior one-third with moderate to dense, coarse punctation, posterior two-thirds with sparse fine punctation, interspaces shiny and just wider than puncture diameter, felt line 0.50 X length of tergum, length anterior to felt line 1.25 X length of tergum posterior to felt line; S2 convex, setae evenly distributed and shorter than shorter mesotibial spur, anteriorly with moderate coarse punctation, interspaces irregular and subequal to puncture diameter, mesal area simple, posteriorly with moderate medium punctation, punctures decreasing in density and size posteriorly, interspaces shiny, felt line absent. Pygidium transverse, slightly convex, margin defined by slightly elevated ridge, posterior margin strongly convex, anterior one-third irregular and moderately punctate, interspaces subequal to puncture diameter, pygidial plate entirely with dense fine punctation, punctures increasing in density and decreasing in size posteriorly; hypopygium with posterior margin convex, mesal area with slight longitudinal depression < 0.5 X length of sternum. Genitalia as in fig. 32.

FEMALE: Description provided in Lelej (1995).

Holotype: ♂, "India, Rajasthan, Jhunjhunun [28°08'N 75°24'E], 19.x.1989 (A. Kompantsev)" (ZMMU).

MATERIAL EXAMINED

TYPE MATERIAL. Paratype: 1♂: INDIA: Rajasthan, Jhunjhunun, 28°08'N 75°24'E, 19.x.1989 (Kompantsev) (1♂, IBPV).

DISTRIBUTION

This species occurs in southern Asia, with specimens recorded only from India (fig. 81).

DISCUSSION

Lelej (1995) described this species, both male and female, from several specimens. Lelej associated the sexes because they were collected together and are morphologically similar. I do not believe this is sufficient evidence for associating different sexes of the same species, but since the females were not studied I will propose no further nomenclatural changes.

Since Lelej (1995) provided drawings with his description, it is relatively easy, in the absence of the holotype, to identify this species. The paratype studied matches Lelej's description and drawings exactly and leaves one in no doubt of the identity of this species. The information provided on the holotype label was transcribed from the original description (Lelej 1995).

This species is most closely related to *T. asiaticus* from which it differs mainly in the posterior shape of the head, sculpturing of the mesal margin of the metacoxa and the presence of the anterior mesal carina on S2. In *T. tharensis*, the sides behind the compound eyes are strongly posteriorly convex, the mesal margin of the metacoxa has a longitudinal carina 0.70 X length of the coxa, the carina has a slightly sclerotised ridge and the anterior mesal area of S2 has the carina absent. In *T. asiaticus*, the sides behind the compound eyes are slightly convergent posteriorly, the mesal margin of the metacoxa has an arched, slightly sclerotised, thin protruding ridge 0.25 X length of the coxa and the anterior mesal area of S2 has a carina present. *Tricholabiodes tharensis*, although it also bears a slight resemblance to *T. pallidus*, can be separated by the combination of characters listed above, as well as the genitalia (figs 32 & 38).

Tricholabiodes nursei Lelej, 1995. ♀ & ♂

Tricholabiodes nursei Lelej, 1995:8, figs 7-9, 11, 13, 15, 16. ♀ & ♂

Since the holotype of *T. nursei* was not studied, only range and mean values for all specimens studied are included in the following redescription.

DIAGNOSIS

MALE: Metasoma with T1 entirely medium yellowish-brown with narrow slightly darker band at apex, T2-T6 dark reddish-brown, becoming paler posteriorly, sterna paler than corresponding terga. Head with sides behind compound eyes subparallel, distinct from weakly convex posterior margin. Free border of clypeus with mesal area protruding in a weak arch, arch mesally notched forming a weak denticle on each side of midline. Middle and inner mandibular teeth separated by distance subequal to width of apical tooth, inner tooth acute. Mesepisternum with mesepisternal groove absent; no mesosternal processes. Mesal margin of metacoxa with longitudinal carina 0.7 X length of coxa, carina with slight sclerotised ridge; metafemur with setae longest at midlength, longer than longer tibial spur; basitarsus with macrosetae absent. Metasoma with anterior one-third of T2 with longitudinal rectangular reticulations, with sparse fine punctation within each reticulation; sternum with setae centrally clumped and longer than shorter mesotibial spur, anterior mesal area without carina, S2 with felt line, posterior margin with mesal setae tufted. S3-S6 with subequal amounts of decumbent and erect setae, setae longer than smaller mesotibial spur. Pygidium with pygidial plate anteriorly smooth although surface slightly irregular, posteriorly with dense fine punctation; mesal area of hypopygium smooth. Genitalia as in fig. 29.

REDESCRIPTION

MALE: Length 9.99-11.90 (mean 10.78) mm. Head, including clypeus and antenna, medium yellowish-brown; mandible almost entirely pale yellowish-brown, apex black, ventral tooth pale reddish-black; mesosoma medium yellowish-brown; legs, including coxae and tibial spurs, pale yellowish-brown; forewing lightly infuscated posterior to marginal cell; pterostigma and wing veins pale yellowish-brown; metasoma with T1 entirely medium yellowish-brown with narrow slightly darker band at apex, T2-T6 dark reddish-brown, becoming paler posteriorly, sterna paler than corresponding terga; entire body, especially the metasoma, covered with long, pallid setae.

Head 1.42-1.59 (mean 1.48) X as wide as long, 0.95-1.03 (mean 0.99) X as wide as mesosoma, 1.56-1.62 (mean 1.59) X as wide as vertex, 1.37-1.46 (mean 1.39) X as long as compound eye, sides behind compound eyes subparallel, distinct from weakly convex posterior margin. Frons with sparse to moderate, fine punctation, interspaces shiny and wider than puncture diameter; foveola deep; surface between median ocellus and foveola smooth, without longitudinal median groove, between toruli longitudinal median groove v-shape in section and deep; scrobal carina arcuate, not reaching scrobal tubercle; antennal tubercle simple, with sparse fine punctation. Vertex 0.64-0.78 (mean 0.74) X as long as wide, 1.36-1.41 (mean 1.38) X as wide as frons; posterior to lateral ocellus with sparse fine

punctation, interspaces shiny and wider than puncture diameter. Compound eye with ommatidia distinct. Ocelli large, convex and broadly oval, median ocellus 0.82-0.86 (mean 0.84) X as long as wide, interocellar distance 1.15-1.25 (mean 1.19) X ocellocular distance. Gena with dense coarse punctation, punctures decreasing in density and size posteriorly, interspaces shiny. Clypeus 0.33-0.36 (mean 0.35) X as high as wide, free border with mesal area protruding in a weak arch, arch mesally notched forming a weak denticle on each side of midline; central portion raised and slightly convex, with sparse fine punctation, interspaces 3 X puncture diameter; vestiture length longer than height of clypeus. Mandible higher than thick, dorsal rim with weak carina along entire length, ending at base of inner tooth; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth separated by distance subequal to width of apical tooth, inner tooth acute; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 0.80-0.95 (mean 0.90) X height at base. Antenna with scape 1.96-2.20 (mean 2.10) X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere simple; second flagellomere 1.45-1.56 (mean 1.50) X length of first, 0.94-0.97 (mean 0.96) X length of third.

Mesosoma, excluding anterior collar, 1.63-1.69 (mean 1.67) X as long as wide. Pronotum 0.88-0.91 (mean 0.90) X as wide as mesosoma, anterodorsal surface with sparse fine punctation mesally becoming pit-like shallow reticulations laterally, strongly convex, humeral angle subsquare, dorsal humeral epaulet subcircular; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct and almost as large as a reticulation; posterior portion of lateral surface with sparse fine punctation, interspaces irregular and wider than puncture diameter, posterior margin impunctate. Mesoscutum 0.85-0.87 (mean 0.86) X as long as wide, 0.79-0.83 (mean 0.81) X as wide as pronotum; between notauli with moderate medium punctation, interspaces smooth and subequal to puncture diameter; laterally with sparse fine punctation, posterolaterally with dense coarse shallow punctation; posterolateral corner raised as an angulate tooth. Scutellum subsquare, entire dorsal surface densely covered with coarse subcircular punctation. Dorsellum with dense medium punctation, laterally simple, although edges of lateral punctures may give the impression that dorsellum is laterally ridged. Propodeum with areola longer than neighbouring areae. Mesepisternum, anterior to scrobe with moderate medium punctation, increasing in density and size posteriorly, posterior to scrobe with pit-like, shallow reticulations, reticulations approximately same size as those on anterior portion of lateral surface of pronotum, scrobe an indistinct subcircular depression, mesepisternal groove absent. Mesosternum with anterior concavity impunctate, posteriorly with sparse punctation, punctures fine to medium; no mesosternal processes.

Forewing: Pterostigma 0.40-0.45 (mean 0.42) X length of anterior margin of marginal cell. Marginal

cell 3.90-4.20 (mean 4.15) X as long as wide, 1.31-1.46 (mean 1.40) X length of second submarginal. Second submarginal cell sessile anteriorly, 0.54-0.64 (mean 0.58) X length of discoidal cell. Third submarginal cell with vein 3r-m tubular anterior to junction with accessory vein, nebulous becoming spectral posterior to junction with accessory vein; medial vein spectral; accessory vein nebulous, 1.20 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur simple with greatest width at midlength; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.69-0.75 (mean 0.72) X length of longer spur, longer spur almost straight; basitarsus straight. Hind leg: Coxa entirely with sparse punctation, interspaces wider than puncture diameter, mesal margin with longitudinal carina 0.7 X length of coxa, carina with slight sclerotised ridge, ventral surface convex; trochanter simple; femur with macrosetae longest at midlength, slightly shorter or same length as longer tibial spur; tibial macrosetae sparsely but evenly distributed, shorter than shorter spur, shorter spur 0.59-0.69 (mean 0.65) X length of longer spur, longer spur almost straight, 0.83-0.92 (mean 0.89) X length of basitarsus; basitarsus with dense microsetae, macrosetae absent, ventral surface with two rows short spines.

Metasoma 1.28-1.30 (mean 1.29) X as long as wide. First segment moderately narrow and fairly long, slightly constricted at apex, 2.26-2.41 (mean 2.35) X as long as wide, 2.79-2.90 (mean 2.85) X as long as high, 0.98-1.02 (mean 1.00) X as long as T2; tergum, except tergulum, irregular with moderate medium punctation, tergulum with moderate fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum with dense coarse punctation, median carina continuous. T2 0.92-1.01 (mean 0.95) X as long as wide, 1.01-1.05 (mean 1.04) X as wide as mesosoma, vestiture subdecumbent to suberect, anterior one-third with moderate to dense, medium punctation, posterior two-thirds with moderate, fine to medium punctation, interspaces shiny and subequal to puncture diameter, felt line 0.47-0.54 (mean 0.50) X length of tergum, length anterior to felt line 1.41-1.55 (mean 1.50) X length of tergum posterior to felt line; S2 convex, setae more dense centrally than laterally and longer than shorter mesotibial spur, anteriorly with dense coarse ill-defined punctation, interspaces irregular and narrower than puncture diameter, mesal area without carina, posteriorly with moderate medium punctation, punctures decreasing in density and size posteriorly, interspaces shiny, felt line 0.15 X length of upper felt line. S3-S6 with subequal amounts of decumbent and erect setae, setae longer than smaller mesotibial spur. Pygidium transverse, slightly convex, posterior margin convex, anterior one-third irregular and moderately punctate, interspaces subequal to puncture diameter, pygidial plate anteriorly smooth although surface slightly irregular, posteriorly with dense and fine punctation; hypopygium with posterior margin convex, mesal area simple. Genitalia as in fig. 29.

FEMALE: Description provided in Lelej (1995).

Holotype: ♂, "India, Rajasthan, Jodhpur, Farm of Central Arid Zone Research Institute, [26°17'N 73°02'E], 7-9.x.1989 (A. Kompantsev)" (ZMMU).

MATERIAL EXAMINED

TYPE MATERIAL. Paratype: 1♂: INDIA: Cazri Farm [= Farm of Central Arid Zone Research Institute], 26°17'N 73°02'E, 7-9.x.1989 (Kompantsev) (1♂, IBPV).

MEASURED MATERIAL. 4♂: INDIA: [1]New Delhi, 28°36'N 77°12'E, 15.*vii*.1967 (K.E. Gibson) light trap (1♂, NMNH); [2, 3, 4]Deesa, 24°15'N 72°10'E, vi.1897 (1♂), iv.1898 (1♂), x.1899 (1♂) (Col. C.G. Nurse collection, 1920-72) *det.* as *pedunculatus* Klug (3♂, NHML).

DISTRIBUTION

This species is restricted to southern Asia, with specimens recorded only from India (fig. 82).

DISCUSSION

Lelej (1995) described this species from three specimens (2♂, 1♀). Lelej associated the sexes because they were collected together and are morphologically similar. I do not believe this is sufficient evidence for associating the sexes, but since the females do not form part of this study I will not propose any further nomenclatural changes.

Since Lelej (1995) provided drawings with his descriptions, it is relatively easy, in the absence of the holotype, to identify this species. The paratype studied matches Lelej's description and drawings exactly and leaves one in no doubt to the identity of this species. The information provided on the holotype label was transcribed from the original description (Lelej 1995).

This species is most similar to *T. ferrugineus* from which it differs in the length of the macrosetae of the metafemur and the orientation and density of setae on S4-S6. In *T. nursei*, the macrosetae of the metafemur are the same length, sometimes slightly shorter, than the longer metatibial spur and S4-S6 has macrosetae decumbent. In *T. ferrugineus*, the macrosetae of the metafemur are not longer than the shorter metatibial spur and S4-S6 has subequal amounts of flat and erect macrosetae.

***Tricholabiodes beludzhistanus* Lelej, 1985. ♂**

Tricholabiodes beludzhistanus Lelej, 1985:152. ♂

[*Tricholabioides* [*sic*]] *beludzhistanus* Lelej; Suárez, 1990:186. ♂

DIAGNOSIS

MALE: Metasoma entirely yellowish-brown. Head with sides behind compound eyes strongly convergent and gradually merging with weakly convex posterior margin. Free border of clypeus with mesal area protruding in a weak arch, arch mesally notched forming a weak denticle on each side of midline. Middle and inner mandibular teeth separated by distance subequal to width of apical tooth, inner tooth subrounded. Dorsellum irregular, midway between edge and median line with weak carina. Mesepisternum with mesepisternal groove absent; no mesosternal processes. Mesal margin of metacoxa simple; basitarsus with dense microsetae, macrosetae absent. Metasoma with anterior one-third of T2 with moderate medium punctation, interspaces basally irregular becoming shiny posteriorly; sternum with anterior mesal area simple, S2 without felt line. Pygidium with pygidial plate entirely with moderate and fine punctation; mesal area of hypopygium simple. Genitalia as in fig. 45.

REDESCRIPTION

MALE: Length 9.78 mm. Head, including clypeus and antenna, pale yellowish-brown; mandible almost entirely pale yellowish-brown, apex black, ventral tooth dark yellowish-brown; mesosoma medium yellowish-brown; legs, including coxae and tibial spurs, golden yellow; forewing lightly infuscated posterior to marginal cell; pterostigma and wing veins golden yellow; metasoma entirely yellowish-brown; entire body, particularly the metasoma, covered with long, pallid setae.

Head 1.55 X as wide as long, 1.01 X as wide as mesosoma, 1.59 X as wide as vertex, 1.26 X as long as compound eye, sides behind compound eyes strongly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with sparse fine punctation, interspaces shiny and wider than puncture diameter; foveola deep; surface between median ocellus and foveola smooth, without longitudinal median groove though slightly longitudinally depressed, between toruli longitudinal median groove rounded in section and shallow; scrobal carina arcuate, not reaching scrobal tubercle; antennal tubercle simple, with sparse fine punctation. Vertex 0.61 X as long as wide, 1.36 X as wide as frons; posterior to lateral ocellus with sparse to moderate, fine punctation, interspaces shiny and wider than puncture diameter. Compound eye with ommatidia distinct. Ocelli large, convex and broadly oval, median ocellus 0.85 X as long as wide, interocellar distance 1.34 X ocellocular distance. Gena with

moderate medium punctation, punctures decreasing in density and size posteriorly. Clypeus 0.21 X as high as wide, free border with mesal area protruding in a weak arch, arch mesally notched forming a weak denticle on each side of midline; central portion raised and slightly convex, with sparse fine punctation, interspaces 3 X puncture diameter; vestiture length longer than height of clypeus. Mandible higher than thick, dorsal rim with carina along entire length, ending at junction between middle and inner tooth; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth separated by distance subequal to width of apical tooth, inner tooth subrounded; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 0.91 X height at base. Antenna with scape 2.30 X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere simple; second flagellomere 1.53 X length of first, 1.07 X length of third.

Mesosoma, excluding anterior collar, 1.58 X as long as wide. Pronotum 0.89 X as wide as mesosoma, anterodorsal surface with sparse fine punctation mesally becoming pit-like shallow reticulations laterally, slightly convex, humeral angle subrounded; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct and almost as large as a reticulation; posterior portion of lateral surface with sparse fine punctation, interspaces irregular and wider than puncture diameter, posterior margin impunctate. Mesoscutum 0.83 X as long as wide, 0.85 X as wide as pronotum; between notauli with sparse to moderate, fine punctation, interspaces smooth and subequal to puncture diameter, laterally with sparse fine punctation, posterolaterally with dense coarse shallow punctation; posterolateral corner raised as an angulate tooth. Scutellum subtrapezoidal, posteriorly convergent, entire dorsal surface sparsely covered with fine to medium punctation, interspaces shiny. Dorsellum irregular, midway between edge of dorsellum and median line with weak carina. Propodeum with areola same length as neighbouring areae. Mesepisternum, anterior to scrobe with sparse medium punctation, punctures increasing in density and size posteriorly, posterior to scrobe with pit-like, shallow reticulations, reticulations approximately same size as those on anterior portion of lateral surface of pronotum, scrobe a distinct subcircular depression, mesepisternal groove absent. Mesosternum with anterior concavity with slight transverse ridges, posteriorly sparsely punctate, punctures fine and ill-defined; no mesosternal processes.

Forewing: Pterostigma 0.38 X length of anterior margin of marginal cell. Marginal cell 3.87 X as long as wide, 1.39 X length of second submarginal. Second submarginal cell sessile anteriorly, 0.54 X length of discoidal cell. Third submarginal cell with vein 3r-m tubular anterior to junction with accessory vein, nebulous becoming spectral posterior to junction with accessory vein; mesal vein spectral; accessory vein

spectral, 1.20 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur simple with greatest width at midlength; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.79 X length of longer spur, longer spur almost straight; basitarsus straight. Hind leg: Coxa entirely with moderate medium punctation, interspaces subequal to puncture diameter, mesal margin simple; trochanter simple; femur with macrosetae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae sparsely but evenly distributed, shorter than shorter spur, shorter spur 0.69 X length of longer spur, longer spur almost straight, 0.72 X length of basitarsus; basitarsus with dense microsetae, macrosetae on posterior surface, ventral surface with two, possibly three, rows of short spines.

Metasoma 1.22 X as long as wide. First segment moderately narrow and fairly long, slightly constricted at apex, 2.31 X as long as wide, 2.78 X as long as high, 1.00 X as long as T2; tergum, except tergulum, irregular with moderate, medium to coarse punctation, tergulum with moderate fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum anteriorly with moderate medium punctation, posteriorly with dense coarse punctation, mesal area without carina. T2 0.97 X as long as wide, 0.99 X as wide as mesosoma, vestiture subdecumbent to suberect, anterior one-third with moderate medium punctation, interspaces basally irregular becoming shiny posteriorly, posterior two-thirds with sparse fine punctation, interspaces shiny and 2-3 X wider than puncture diameter, felt line 0.59 X length of tergum, length anterior to felt line 1.00 X length of tergum posterior to felt line; S2 convex, setae evenly distributed and shorter than shorter mesotibial spur, entirely with sparse, fine to medium punctation, anteriorly interspaces irregular, posteriorly interspaces smooth, mesal area simple, felt line absent. Pygidium with posterior margin strongly convex, anterior one-third shiny and moderately punctate, interspaces subequal to puncture diameter, pygidial plate entirely moderately and finely punctate; hypopygium with posterior margin convex, mesal area simple. Genitalia as in fig. 45.

FEMALE: Unknown.

MATERIAL EXAMINED

TYPE MATERIAL. Holotype: ♂, "[Юго-Вост. Иран:] г. Бемдур и его / окрестн; ювДерсіа [Locality not known] / Зарудн. 12-8 iv [19]01"; "Coll. Semenov - Tian - Shansky"; "Tricholabiodes ♂ / beludzhistanus sp.n. / Leley det. 1981" (IBPV). English translation: South-east Iran, Bampur and peripheral areas, 12-18.iv.1901 (Zarudnyi).

DISTRIBUTION

This species occurs in southwestern Asia, with specimens recorded only from south east Iran

DISCUSSION

Lelej (1985) described this species from a single specimen, caught by Zarudnyi. The original description is written as a comparison with the preceding species, *T. asiaticus* (Lelej 1985). It is not a full description but an inadequate diagnosis of the characteristic features. This species is included in a key (Lelej 1985; Suárez 1990) to some of the Palaearctic species and a incomplete catalogue of all described species of *Tricholabiodes* (Suárez 1990).

Tricholabiodes beludzhistanus is most similar to *T. asiaticus*. These two species can be separated by the posterior shape of the head behind the compound eyes, sculpturing on the mesal margin of the metacoxa, absence of the felt line and the anterior mesal carina on S2, and the shape of the genitalia (figs 40 & 45). In *T. beludzhistanus*, the sides of the head behind the compound eyes are strongly convergent posteriorly, the mesal margin of the metacoxa is simple, and S2 has the felt line and anterior mesal carina absent. In *T. asiaticus*, the sides of the head behind the compound eyes are slightly convergent posteriorly, the mesal margin of the metacoxa has an arched, slightly sclerotised, protruding ridge 0.25 X length of the coxa, and S2 has the felt line and anterior mesal carina present.

***Tricholabiodes asiaticus* Radoszkowski, 1885.** ♂ & ♀

T. [*richolabiodes*] *asiaticus* Radoszkowski, 1885:36, fig. 69a, 69b. ♂

T. [*richolabiodes*] *asiaticus* Rad.[oszkowski]; Radoszkowski, 1887:99. ♀

Tr. [*icholabiodes*] *asiaticus* Rad.[oszkowski]; Radoszkowski, 1893:74. ♂

[*Mutilla (Tricholabiodes)*] *asiatica* (Rad.[oszkowski]); André, 1896a:267. ♂

Mutilla asiatica (Rad.[oszkowski]); André, 1899:22. ♀ & ♂

[*Mutilla (Tricholabiodes)*] *aegyptiaca* Rad.[oszkowski]; André, 1901:171, 172, 175, Pl. 7 (in part). ♀ & ♂

[*Tricholabiodes*] *aegyptiaca* [*sic*] Rad.[oszkowski]; André, 1910: 32, 33, fig. 4 (in part). ♀ & ♂.

T. [*richolabioides* [*sic*]] *aegyptiaca* [*sic*] Rad[o]s[z]k[owski].; Zavattari, 1910:3. ♂

[*Tricholabioides* [*sic*]] *semistriata* [*sic*] Klug; Bischoff, 1920:104 (misidentification). ♂

Tricholabioides [*sic*] *aegyptiaca* [*sic*] (Rad.[oszkowski]); Skorikov, 1935:306, Table 5, fig. 3 (in part). ♀ & ♂

[*Tricholabioides* [*sic*]] *aegyptiaca* [*sic*] (Rad.[oszkowski]); Suárez, 1963:922, 923, 924, fig. 4. ♂

Tricholabiodes asiaticus Radoszkowski; Lelej & Kabakov, 1980:186, 187. ♀ & ♂

Tricholabiodes asiaticus Radoszkowski; Lelej & Kabakov, 1981:146, 147. ♀ & ♂

Tricholabiodes asiaticus Rad.[oszkowski]; Lelej, 1985:149, 150. ♀ & ♂

[*Tricholabioides* [*sic*]] *asiaticus* [Radoszkowski]; Suarez, 1990: 184, 186. ♀ & ♂

Tricholabiodes asiaticus Radoszkowski; Lelej, 1995:9. ♂

Since the lectotype of *T. asiaticus* was not studied, only the range and mean values for all specimens studied are included in the following redescription.

DIAGNOSIS

MALE: Metasoma with T1 entirely medium yellowish-brown, T2-T6 medium yellowish-brown to dark reddish-brown, sometimes becoming paler posteriorly, sterna paler than corresponding terga. Head with sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Free border of clypeus with mesal area protruding in a weak arch, arch mesally notched forming a weak denticle on each side of midline. Middle and inner mandibular teeth separated by distance subequal to width of apical tooth, inner tooth acute. Dorsellum with dense fine punctation, laterally ridged. Mesepisternum with mesepisternal groove absent; no mesosternal processes. Mesal margin of metacoxa with arched, slightly sclerotised, thin, protruding ridge 0.25 X length of coxa; basitarsus with dense microsetae, macrosetae absent. Metasoma with anterior one-third of T2 with dense, slightly oval punctation; sternum with anterior mesal area with slight carina, < 0.5 X length of sternum, S2 with felt line. Pygidium with pygidial plate anteriorly irregular, posteriorly densely and finely punctate; Mesal area of hypopygium with longitudinal depression < 0.5 X length of sternum. Genitalia as in fig. 40.

REDESCRIPTION

MALE: Length 8.79-14.21 (mean 11.48) mm. Head, including clypeus and antenna, pale to medium yellowish-brown, sometimes antenna golden yellow; mandible almost entirely pale yellowish-brown, apex black, ventral tooth pale reddish-black; mesosoma medium yellowish-brown; legs, including coxae and tibial spurs, golden yellow; forewing lightly infuscated posterior to marginal cell; pterostigma and wing veins golden yellow; metasoma with T1 entirely medium yellowish-brown, T2-T6 medium yellowish-brown to dark reddish-brown, sometimes becoming paler posteriorly, sterna paler than corresponding terga; entire body, especially the metasoma, covered with long, pallid setae.

Head 1.41-1.49 (mean 1.45) X as wide as long, 0.91-1.04 (mean 0.98) X as wide as mesosoma, 1.51-1.64 (mean 1.57) X as wide as vertex, 1.35-1.42 (mean 1.39) X as long as compound eye, sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with sparse, fine to medium punctation, interspaces shiny and wider than puncture diameter; foveola deep; surface between median ocellus and foveola smooth, without longitudinal median groove, between toruli longitudinal median groove subrounded in section and shallow; scrobal carina slight, arcuate, not reaching scrobal tubercle; antennal tubercle simple, with sparse fine punctation. Vertex 0.67-0.76 (mean 0.72) X as long as wide, 1.31-1.48 (mean 1.39) X as wide as frons; posterior to lateral ocellus with sparse fine punctation, interspaces shiny and wider than puncture diameter. Compound eye with ommatidia distinct. Ocelli large, convex and broadly oval, median ocellus 0.82-0.98 (mean 0.87) X as long as wide, interocellar distance 1.20-1.38 (mean 1.30) X ocellocular distance. Gena with sparse medium punctation, interspaces irregular. Clypeus 0.34-0.41 (mean 0.37) X as high as wide, free border with mesal border protruding in a weak arch, arch mesally notched forming a weak denticle on each side of midline; central portion raised and slightly convex, sparsely and finely punctate, interspaces 3 X puncture diameter; vestiture length longer than height of clypeus. Mandible higher than thick, dorsal rim with carina along entire length, ending at base of inner tooth; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth separated by distance subequal to width of apical tooth, inner tooth acute; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 0.82-0.93 (mean 0.86) X height at base. Antenna with scape 2.12-2.28 (mean 2.19) X length of first flagellomere; anterior surface with one longitudinal carina; first flagellomere simple; second flagellomere 1.29-1.48 (mean 1.40) X length of first, 0.98-1.07 (mean 1.03) X length of third.

Mesosoma, excluding anterior collar, 1.53-1.64 (mean 1.60) X as long as wide. Pronotum 0.86-0.90 (mean 0.89) X as wide as mesosoma, anterodorsal surface with sparse fine ill-defined punctation mesally becoming pit-like shallow reticulations laterally, slightly convex, humeral angle subrounded; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct and almost as large as a reticulation; posterior portion of lateral surface with sparse fine punctation, interspaces irregular and wider than puncture diameter, posterior margin impunctate. Mesoscutum 0.79-0.86 (mean 0.84) X as long as wide, 0.81-0.90 (mean 0.84) X as wide as pronotum; between notauli with moderate medium punctation, interspaces smooth and subequal to puncture diameter, laterally with moderate, fine to medium punctation, posterolaterally with dense coarse shallow punctation; posterolateral corner raised as an angulate tooth. Scutellum subtrapezoidal, posteriorly convergent, entire dorsal surface densely

covered with coarse semicircular punctation. Dorsellum with dense fine punctation, laterally ridged. Propodeum with areola same length as neighbouring areae. Mesepisternum, anterior to scrobe with moderate medium punctation, increasing in density and size posteriorly, posterior to scrobe with pit-like, shallow reticulations, reticulations approximately same size as those on anterior portion of lateral surface of pronotum, scrobe a distinct subcircular depression, mesepisternal groove absent. Mesosternum with anterior concavity transversely ridged, posteriorly with sparse punctation, punctures fine and ill-defined; no mesosternal processes.

Forewing: Pterostigma 0.31-0.49 (mean 0.37) X length of anterior margin of marginal cell. Marginal cell 3.68-4.33 (mean 4.06) X as long as wide, 1.30-1.58 (mean 1.44) X length of second submarginal. Second submarginal cell sessile anteriorly, 0.45-0.60 (mean 0.49) X length of discoidal cell. Third submarginal cell with vein 3r-m tubular anterior to junction with accessory vein, nebulous becoming spectral posterior to junction with accessory vein, medial vein spectral; accessory vein nebulous, 1.05 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur simple with greatest width at midlength; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.68-0.89 (mean 0.79) X length of longer spur, longer spur almost straight; basitarsus straight. Hind leg: Coxa entirely with moderate medium punctation, interspaces subequal to puncture diameter, mesal margin with arched, slightly sclerotised, thin, protruding ridge 0.25 X length of coxa, ventral surface convex; trochanter simple; femur with macrosetae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae sparsely but evenly distributed, shorter than shorter spur, shorter spur 0.74-0.84 (mean 0.77) X length of longer spur, longer spur almost straight, 0.65-0.79 (mean 0.74) X length of basitarsus; basitarsus with dense microsetae, macrosetae absent, ventral surface with two, sometimes three, rows of short spines.

Metasoma 1.03-1.37 (mean 1.18) X as long as wide. First segment moderately narrow and fairly long, slightly constricted at apex, 1.93-2.31 (mean 2.20) X as long as wide, 2.64-2.91 (mean 2.77) X as long as high, 0.88-1.07 (mean 0.99) X as long as T2; tergum, except tergulum, irregular with moderate medium punctation, tergulum with moderate fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum with dense coarse punctation, median carina continuous. T2 0.88-1.05 (mean 0.96) X as long as wide, 1.01-1.08 (mean 1.03) X as wide as mesosoma, vestiture subdecumbent to suberect, anterior one-third with dense coarse slightly oval punctation, posterior two-thirds with moderate to dense and fine to medium punctation, interspaces

shiny, felt line 0.47-0.61 (mean 0.50) X length of tergum, length of tergum anterior to felt line 1.07-2.00 (mean 1.46) X length of tergum posterior to felt line; S2 convex, setae evenly distributed and shorter than shorter mesotibial spur, anteriorly with dense coarse ill-defined punctation, interspaces irregular and narrower than puncture diameter, mesal area with slight carina < 0.5 X length of sternum, posteriorly with moderate, fine to medium punctation, interspaces shiny and subequal to puncture diameter, felt line 0.15 X length of upper felt line. Pygidium transverse, margin defined by slightly elevated ridge, posterior margin slightly convex, anterior one-third irregular and moderately punctate, interspaces subequal to puncture diameter, pygidial plate anteriorly irregular, posteriorly with dense fine punctation, punctures ill-defined; hypopygium with posterior margin convex, mesal area simple. Genitalia as in fig. 40.

FEMALE: Descriptions provided by Radoszkowski (1887), André (1899) and Skorikov (1935)

Lectotype (designated by Lelej and Kabokov, 1980): ♂, "Ashabad [= Ashgabat; 37°57'N 58°23'E]"; with handwritten label of F. Morawitz "*Tricholabioides* [*sic*] *asiatica* [*sic*] Rad., Typ" (ZMAS).

MATERIAL EXAMINED

TYPE MATERIAL. Paralectotype: 1♂: "Trans- / caspi"; "Type"; "Coll. / Radosz."; *Tricholabiodes / asiaticus*" [handwritten]; "*Tricholabiodes / asiaticus* Radosz. / B. Petersen det. 1988" (1♂, ZMHB).

MEASURED MATERIAL. 17♂: TURKMENISTAN: [6]Turkmeniya, Kara-Bogaz, 40 km N. Kizyl-Arvat, 41°02'N 52°55'E, 9.iv.1953 (Kryzhanosky) *det.* by Lelej as *T. aegyptiacus* (Rad.) (1♂, UCDC); [10]Turkmeniya, Repetek, 38°35'N 63°11'E, 5.vii.1973 (V. Kuenetsov) *det.* by Gorbatovsky as *T. asiaticus* (Rad.) (1♂, NHML), [11]29.v.1976 (Lelej) to light (1♂, MNCN), [12, 13]18.ix.1978 (Lelej) to light, *det.* by Lelej as *T. asiaticus* Rad. (2♂, NHML); [1]Utsh-Adzhi, 38°05'N 62°48'E, v.1914 (N. Plavilstshikov) (1♂, MNCN); [4]Ashgabat, 37°57'N 58°23'E, *det.* by Bischoff as *asiaticus* Rad. (1♂, MNCN), [3](Radoszkowski) *det.* as *T. asiaticus* (1♂, MNHN), [5]*det.* as *T. asiaticus* (1♂, MNHN), [2]vi.1892, *det.* by Under as *asiaticus* Rad (1♂, NHML), [7]1900 (R. Du Buysson) *det.* by Radoszkowski as *T. asiaticus* (1♂, MNHN), [8]1910 (E. Saunders, 266) *det.* as *T. asiaticus* (1♂, NHML). TAJIKISTAN: [17]South Tajikistan, Tigrovaya Balka, 37°20'N 68°30'E, 18.vi.1975 (V. Gorbatovsky) *det.* by Gorbatovsky as *T. asiaticus* Rad. (1♂, NHML). PAKISTAN: [9]Kalat, 29°02'N 66°35'E, 6.v.1931 (A.C. Sen) (1♂, NHML); [16]Lasbella Prov., 8 km S. of Bella, 25°45'N 66°35'E, 27.iii.1965 (John W. Neal) (1♂, NMNH); [14]Lasbella Prov., 43 mi. N. of Karachi, 24°52'N 67°03'E, 28.iii.1.iv.1965 (John W. Neal) (1♂, NMNH). Locality indefinite: [15]"Transcaspia" (1♂, MNHN).

ADDITIONAL MATERIAL. 18♂: UZBEKISTAN: South-eastern border of desert Kyzylkum, 42°30'N 64°30'E, 11.vii.1961 (Nikolayev) *det.* by Lelej as *aegyptiacus* (1♂, NMNH). TURKMENISTAN: Mollakara, 39°39'N 54°10'E, 1901 (Heymons & Samter) *det.* as *T. aegyptiacus* Rad. (= *asiatica* Rad.) (1♂, MTMB); Repetek, 38°35'N 63°11'E, v.1914 (N. Plavitstshikov) (1♂, MNCN); Turkmeniya, Repetek, 38°35'N 63°11'E, 5.xi.1972 (V. Kuenetsov) *det.* by Gorbatovsky as *T. asiaticus* (Rad.) (2♂, NHML), 27.v.1976 (Lelej) to light, *det.* by Lelej as *T. asiaticus* Rad. (1♂, DJBC), 29.v.1976 (Lelej) to light (1♂, DJBC), *det.* by Lelej as *T. asiaticus* Rad. (1♂, MNCN); Ashgabat, 37°57'N 58°23'E, *det.* as *T. aegyptiacus* Rad. (1♂, MTMB), *det.* as *T. asiaticus* R. (1♂, MTMB); Merw [= Mary], 37°36'N 61°50'E, 1915 (J. Perez, 480) *det.* as *Tricholabiodes asiaticus* Rad. (1♂, MNHN); 1919 (J. De Gaulle) *det.* as *Tricholabiodes asiaticus* (1♂, MNHN). IRAN: Fars Chad moslem, 26°50'N 54°40'E, 25.xi.1968 (R.W. Rust) at light (1♂, UCDC). PAKISTAN: Makran Prov., 23 mi. E. of Turbat, 26°00'N 63°03'E, 8-11.iii.1965 (John W. Neal) (1♂, NMNH); Lasbella Prov., 8 km S. of Bella, 25°45'N 66°35'E, 27.iii.1965 (John W. Neal) *det.* by Brothers as *Tricholabiodes* (1♂, NMNH); Ormara, 25°12'N 64°38'E, 1904 (W.D. Cumming, 286) (1♂, NHML). Locality not given: "Lieutenant / Manissier / 1893" (1♂, MNHN). Locality indefinite: "Transcaspia"; "Radoszk [=Radoszkowski]" (1♂, MNHN).

DISTRIBUTION

This species occurs in southwestern Asia with specimens recorded from Uzbekistan, Turkmenistan, Tajikistan, Iran and Pakistan (fig. 82).

DISCUSSION

Radoszkowski (1885), in describing this species, did not provide information on the specimens used nor did he designate a holotype. The lectotype, designated by Lelej & Kabakov (1980, 1981), was not seen. Their reasons for choice of specimen designated as the lectotype were not given. The previous status of the specimen identified in this redescription as a paralectotype is uncertain but all evidence indicates that it forms part of the syntype series. This specimen, with label "Trans - / Caspi ... *Tricholabiodes* / *asiaticus* [handwritten] ... Coll. / Radosz." matches Radoszkowski's (1885) description. Since I am unfamiliar with Radoszkowski's handwriting, it is difficult to ascertain if the determination label was written by him. The handwriting of the determination label does not match André's, nor does the spelling of *Tricholabiodes* agree with Bischoff's, who always spelt the genus as *Tricholabioides*. The additional label "Coll. / Radosz" confirms this specimen formed part of Radoszkowski's collection; while "...Type..." supports the idea that the specimen is part of the type series. Radoszkowski is one of the first mutillid wasp systematists to study mutillid wasp genitalia and he included these characters in

his description. This specimen has the genitalia dissected out and mounted on a cardboard stage. All evidence seems to support this specimen as part of the syntype series, and it is thus designated here as a paralectotype.

Radoszkowski (1887), in describing the female of *T. asiaticus*, provided no information on how he associated the two sexes. Radoszkowski (1893) and André (1899) briefly compared *T. asiaticus* (♀ & ♂) with *T. pedunculatus* ♂, and *T. aegyptiacus* ♀. André concluded that *T. asiaticus* ♂, and *T. pedunculatus* ♂, are separate species, but he believed that *T. aegyptiacus* ♀, and *T. asiaticus* ♀, belong to the same species. André (1901) synonymised *T. aegyptiacus* with *T. asiaticus*, with the latter being the junior synonym, because the two, although not morphologically identical, were collected from the same area. André (1910) confirmed this synonymy when describing *T. aegyptiacus* ♀ and ♂. Bischoff (1920), providing no reason, synonymised *T. semistriatus* ♀, with *T. aegyptiacus* ♀, and *T. pedunculatus* ♂, with *T. asiaticus* ♂. In summary, Bischoff only recognized one species, *T. semistriatus*, for these four previously described species. Skorikov (1935) rejected the synonymy created by Bischoff and provided a drawing of the genitalia of *T. aegyptiacus* ♂. Suárez (1963) agreed with André's (1901) synonymy, since *T. aegyptiacus* was the only female known from central Asia; thus, having the same geographical distribution as *T. asiaticus* ♂. Lelej (1985), in an attempt to eliminate the confusion surrounding the identity of this species, provided descriptions of the male and female of *T. asiaticus*. Furthermore, he rejected the synonymy of *T. asiaticus* ♀, and *T. aegyptiacus* ♀.

From the above it is clear that there has been considerable confusion regarding the status of *T. asiaticus* ♀. Since this study excludes the females, I will make no further nomenclatural changes here except to remain in agreement with Radoszkowski (1885, 1887), even though he did not provide a reason for associating the sexes, and with Lelej (1985) and Suárez (1990) over the rejection of the synonymy of *T. asiaticus* ♀, and *T. aegyptiacus* ♀.

Tricholabiodes asiaticus is one of several species which occurs in the easternmost region of this genus's distribution. This species is most similar to *T. beludzhistanus*. These two species can be separated by the posterior shape of the head behind the compound eyes, sculpturing on the mesal margin of the metacoxa, absence of the felt line and anterior mesal carina on S2, and the genitalia (figs 40 & 45). In *T. asiaticus*, the sides of the head behind the compound eyes are slightly convergent posteriorly, the mesal margin of the metacoxa has an arched, slightly sclerotised, thin, protruding ridge 0.25 X length of the coxa, and S2 has the felt line and anterior mesal carina present. In *T. beludzhistanus*, the sides

of the head behind the compound eyes are strongly convergent posteriorly, the mesal margin of the metacoxa is simple, and S2 has the felt line and anterior mesal carina absent. *Tricholabiodes asiaticus* is also very similar to *T. tharensis* but a comparison of the genitalia (figs 32 & 40) leaves one in no doubt to the identity of these species.

***Tricholabiodes pallidus* Lelej, 1985. ♂**

Tricholabiodes pallidus Lelej, 1985:149, 151. ♂
[*Tricholabioides* [*sic*]] *pallidus* Lelej; Suárez, 1990:186. ♂

DIAGNOSIS

MALE: Metasoma with T1 entirely medium yellowish-brown, T2-T6 dark reddish-brown. Head with sides strongly convergent posteriorly and gradually merging with weakly convex posterior margin. Free border of clypeus strongly convex with a weak protuberance on each side of midline. Middle and inner mandibular teeth separated by distance subequal to width of apical tooth, inner tooth subrounded. Dorsellum with dense medium punctation, laterally simple. Mesepisternum with mesepisternal groove absent; no mesosternal processes. Mesal margin of metacoxa with a slight protuberance ending apically with a weakly sclerotised denticle; basitarsus with dense microsetae, macrosetae absent. Metasoma with anterior one-third of T2 with moderate medium punctation; anterior mesal area of S2 with slight carina < 0.5 X length of sternum, S2 with felt line. Pygidium with pygidial plate with moderate fine punctation, except anterior median area smooth; mesal area of hypopygium with longitudinal depression < 0.5 X length of sternum. Genitalia as in fig. 38.

REDESCRIPTION

MALE: Length 13.88 mm. Head, including clypeus and antenna, pale to medium yellowish-brown, antenna pale yellowish-brown; mandible almost entirely pale yellowish-brown, apex black, ventral tooth medium yellowish-brown to pale reddish-brown; mesosoma medium yellowish-brown; legs, including coxae and tibial spurs, pale yellowish-brown; forewing lightly infuscated posterior to marginal cell; pterostigma and wing veins golden yellow to pale yellowish-brown; metasoma with T1 entirely medium yellowish-brown, T2-T6 dark reddish-brown, sterna paler than corresponding terga; entire body covered with long, pallid setae.

Head 1.55 (1.53-1.55, mean 1.54) X as wide as long, 0.93 (0.93-0.96, mean 0.95) X as wide as

mesosoma, 1.56 (1.52-1.56, mean 1.54) X as wide as vertex, 1.34 (1.34-1.35, mean 1.34) X as long as compound eye, sides behind compound eyes strongly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with sparse fine punctation, interspaces shiny and wider than puncture diameter; foveola deep; surface between median ocellus and foveola smooth, without longitudinal median groove, between toruli longitudinal median groove subrounded in section and shallow; scrobal carina weak, arcuate, extending to scrobal tubercle; antennal tubercle simple, with sparse fine punctation. Vertex 0.61 (mean 0.61) X as long as wide, 1.33 (1.33-1.35, mean 1.34) X as wide as frons; posterior to lateral ocellus with sparse fine punctation, interspaces shiny and wider than puncture diameter. Compound eye with ommatidia indistinct. Ocelli large, convex and broadly oval, median ocellus 0.87 (0.73-0.87, mean 0.80) X as long as wide, interocellar distance 0.97 (0.97-1.01, mean 0.99) X ocellocular distance. Gena with dense coarse punctation, with punctures decreasing in density and size posteriorly, interspaces shiny. Clypeus 0.40 (0.40-0.41, mean 0.41) X as high as wide, free border strongly convex and slightly notched forming a weak protuberance on each side of midline; central portion raised and slightly convex, with moderate fine punctation, interspaces subequal to puncture diameter; vestiture length longer than height of clypeus. Mandible higher than thick, dorsal rim with carina along entire length, ending at base of inner tooth; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth separated by distance subequal to width of apical tooth, inner tooth subrounded; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 0.83 (mean 0.83) X height at base. Antenna with scape 1.98 (1.98-2.08, mean 2.03) X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere simple; second flagellomere 1.45 (1.45-1.49, mean 1.47) X length of first, 1.06 (1.06-1.11, mean 1.09) X length of third.

Mesosoma, excluding anterior collar, 1.55 (1.53-1.55, mean 1.54) X as long as wide. Pronotum 0.94 (0.92-0.94, mean 0.93) X as wide as mesosoma, anterodorsal surface moderate medium ill-defined punctation mesally becoming pit-like shallow reticulations laterally, strongly convex, humeral angle subrounded; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct and almost as large as a reticulation; posterior portion of lateral surface with sparse fine punctation, interspaces irregular and wider than puncture diameter, posterior margin impunctate. Mesoscutum 0.82 (0.79-0.82, mean 0.81) X as long as wide, 0.82 (0.82-0.85, mean 0.84) X as wide as pronotum; entirely with moderate medium punctation, interspaces smooth and subequal to puncture diameter, posterolaterally with dense coarse shallow punctation; posterolateral corner raised as an angulate tooth. Scutellum subtrapezoidal, posteriorly convergent, entire dorsal surface densely covered with coarse subcircular punctation. Dorsellum with dense medium punctation, laterally simple, although edges of

lateral punctures may give the impression that dorsellum is laterally ridged. Propodeum with areola same length as neighbouring areae. Mesepisternum, anterior to scrobe with dense coarse punctation becoming pit-like, shallow reticulations posteriorly, posterior to scrobe with pit-like shallow reticulations, reticulations approximately same size as those on anterior portion of lateral surface of pronotum, scrobe a distinct subcircular depression, mesepisternal groove absent. Mesosternum with anterior concavity transversely ridged, posteriorly with sparse punctation, punctures fine and ill-defined; no mesosternal processes.

Forewing: Pterostigma 0.37 (0.37-0.41, mean 0.39) X length of anterior margin of marginal cell. Marginal cell 3.93 (3.93-4.39, mean 4.16) X as long as wide, 1.20 (1.20-1.32, mean 1.26) X length of second submarginal. Second submarginal cell sessile anteriorly, 0.59 (0.58-0.59, mean 0.58) X length of discoidal cell. Third submarginal cell with vein 3r-m tubular anterior to junction with accessory vein, nebulous becoming spectral posterior to junction with accessory vein, medial vein anteriorly tubular, posteriorly spectral; accessory vein nebulous, 1.25 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur simple with greatest width at midlength; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.74 (0.68-0.74, mean 0.71) X length of longer spur, longer spur almost straight; basitarsus straight. Hind leg: Coxa entirely with moderate medium punctation, interspaces subequal to puncture diameter, mesal margin with a slight protuberance ending apically with a weakly sclerotised denticle, ventral surface convex; trochanter simple; femur with setae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae sparsely but evenly distributed, shorter than shorter spur, shorter spur 0.75 (mean 0.75) X length of longer spur, longer spur almost straight, 0.63 (0.63-0.75, mean 0.69) X length of basitarsus; basitarsus with dense microsetae, macrosetae absent, ventral surface with two rows short spines.

Metasoma 1.20 (1.09-1.20, mean 1.15) X as long as wide. First segment moderately narrow and slightly constricted at apex, 1.70-1.98, mean 1.84) X as long as wide, 2.07 (2.07-2.50, mean 2.29) X as long as high, 1.06 (1.06-1.08, mean 1.07) X as long as T2; tergum, except tergulum, irregular with dense coarse punctation, tergulum with moderate fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum with dense coarse punctation, median carina slight. T2 0.80 (0.80-0.92, mean 0.86) X as long as wide, 1.06 (1.02-1.06, mean 1.04) X as wide as mesosoma, vestiture dense, subdecumbent to suberect, anterior one-third with moderate medium punctation, posterior two-thirds with sparse, fine to medium punctation, interspaces shiny and wider than puncture diameter, felt line 0.64 (0.47-0.64, mean 0.56) X length of tergum, length anterior to felt line

1.36 (1.32-1.36, mean 1.34) X length of tergum posterior to felt line; S2 convex, setae evenly distributed and shorter than shorter mesotibial spur, anteriorly with moderate coarse punctation, interspaces irregular and subequal to puncture diameter, mesal area with slight carina < 0.5 X length of sternum, posteriorly with sparse to moderate, medium punctation, interspaces shiny and subequal to puncture diameter, felt line 0.40 X length of upper felt line. Pygidium with posterior margin strongly convex, anterior one-third irregular and moderately punctate, interspaces subequal to puncture diameter, pygidial plate entirely moderate and finely punctate, except anterior mesal area smooth; hypopygium with posterior margin convex, mesal area with longitudinal depression < 0.5 X length of sternum. Genitalia as in fig. 38.

FEMALE: Unknown.

MATERIAL EXAMINED

TYPE MATERIAL. Holotype: ♂, "[Юго-Вост. Иран:]Керман: сгр. Бамдур. / Каравандар [27°35'N 60°48'E], 23-24.iv. / Н. Зарудный. 1901"; "Coll. Semenov - Tian - Shansky"; "Tricholabiodes ♂ / zagidnyi sp.n. / Leley det. 1981" (IBPV). English Translation: South-East Iran: Kerman, state Bampur, Karavandar, 27°35'N 60°48'E, 23-24.iv.1901 (N. Zarudnyi).

MEASURED MATERIAL. 1♂: PAKISTAN: Makran Prov., 23 mi. E. of Turbat, 26°00'N 63°06'E, 8-11.iii.1965 (J.W. Neal) (1♂, NMNH).

DISTRIBUTION

This species occurs in southwestern Asia, with specimens seen from Iran and Pakistan (fig. 82).

DISCUSSION

Lelej (1985) described this species from a single specimen, collected by Zarudnyi. The description is vague, stating only the diagnostic features used for identifying this species. Suárez (1990) includes this species in a catalogue of virtually all described species of the genus.

This species cannot in the absence of the holotype be identified from the original description or key (Lelej 1985). This species, although most similar to *T. tharensis*, can be separated by the sculpturing on the mesal margin of the metacoxa and the genitalia (figs 32 & 38). *Tricholabiodes pallidus* has the mesal margin of the metacoxa with a slight protuberance ending apically with a weakly sclerotised denticle, while the mesal margin of the metacoxa of *T. tharensis* has a longitudinal carina.

***Tricholabiodes saharicus* Suárez, 1967. ♂**

Tricholabioides [*sic*] *saharicus* Suárez, 1967:566. ♂

[*Tricholabioides* [*sic*]] *saharicus* Suár[ez]; Suárez, 1977:218. ♂

[*Tricholabioides* [*sic*]] *saharicus* Suárez; Suárez, 1990:184, 187. ♂

DIAGNOSIS

MALE: Metasoma with T1 entirely medium yellowish-brown with narrow dark yellowish-brown band at apex, T2-T6 medium reddish-brown, becoming dark yellowish-brown posteriorly, sterna paler than corresponding terga. Head with sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with scrobal carina arcuate, not reaching scrobal tubercle. Free border of clypeus with mesal area truncated straight, sometimes mesally notched forming a weak denticle on each side of midline. Middle and inner mandibular teeth separated by distance subequal to width of apical tooth, inner tooth acute. Dorsellum with dense medium punctation, laterally ridged. Mesepisternum with mesepisternal groove absent; no mesosternal processes. Mesal margin of metacoxa with arched protruding ridge slightly angulated posteriorly, 0.5 X length of coxa. Metasoma with T2 entirely with moderate, medium to coarse punctation becoming sparsely punctate posteriorly; anterior mesal area of S2 without carina, S2 without felt line. Posterior margin of pygidium square, pygidial plate entirely with dense fine punctation, except anterolateral margin smooth; posterior margin of hypopygium convex, mesal area with longitudinal depression < 0.5 X length of sternum. Genitalia as in fig. 66.

REDESCRIPTION

MALE: Length 9.02 (6.59-13.70, mean 10.87) mm. Head, including clypeus and antennae, pale yellowish-brown; mandible almost entirely pale yellowish-brown, apex black, ventral tooth pale reddish-black; mesosoma and legs, including coxae and tibial spurs, pale yellowish-brown; forewing lightly infuscated posterior to pterostigma; pterostigma and wing veins pale yellowish-brown; metasoma with T1 entirely medium yellowish-brown with narrow dark yellowish-brown to pale reddish-black band at apex but sometimes indistinct, T2-T6 pale to dark reddish-brown, becoming dark yellowish-brown posteriorly, sterna paler than corresponding terga; entire body covered with long, pallid setae.

Head 1.56 (1.42-1.59, mean 1.50) X as wide as long, 1.00 (0.91-1.09, mean 0.96) X as wide as mesosoma, 1.49 (1.47-1.56, mean 1.52) X as wide as vertex, 1.31 (1.27-1.47, mean 1.37) X as long as

compound eye, sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with sparse fine punctation, interspaces shiny and wider than puncture diameter; foveola deep; surface between median ocellus and foveola without longitudinal median groove though smooth and slightly longitudinally depressed but sometimes indistinct, between toruli longitudinal median groove subrounded in section and shallow; scrobal carina arcuate, not reaching scrobal tubercle but sometimes indistinct; antennal tubercle simple, sparsely and finely punctate. Vertex 0.55 (0.55-0.74, mean 0.63) X as long as wide, 1.41 (1.28-1.51, mean 1.38) X as wide as frons; posterior to lateral ocellus with sparse fine punctation, interspaces shiny and wider than puncture diameter. Compound eye with ommatidia distinct. Ocelli large, convex and broadly oval, median ocellus 0.77 (0.77-0.95, mean 0.86) X as long as wide, interocellar distance 1.52 (0.95-1.62, mean 1.27) X ocellocular distance. Gena with moderate medium punctation, becoming sparsely punctured posteriorly, interspaces irregular. Clypeus 0.40 (0.30-0.42, mean 0.38) X as high as wide, free border with mesal area truncated straight, sometimes mesally notched forming a weak denticle on each side of midline; central portion raised and slightly convex, with sparse medium punctation, interspaces > puncture diameter; vestiture length subequal to height of clypeus. Mandible higher than thick, dorsal rim with carina along entire length, ending at base of inner tooth; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth separated by distance subequal to width of apical tooth, inner tooth acute; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 0.92 (0.79-0.97, mean 0.88) X height at base. Antenna with scape 1.92 (1.77-2.23, mean 1.95) X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere simple; second flagellomere 1.37 (1.27-1.56, mean 1.40) X length of first, 1.05 (0.92-1.15, mean 1.03) X length of third.

Mesosoma, excluding anterior collar, 1.61 (1.50-1.76, mean 1.64) X as long as wide. Pronotum 0.94 (0.40-0.97, mean 0.88) X as wide as mesosoma, anterodorsal surface with moderate fine punctation mesally becoming pit-like shallow reticulations laterally, strongly convex, humeral angle subrounded; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct and almost as large as a reticulation; posterior portion of lateral surface with sparse fine punctation, interspaces irregular and wider than puncture diameter, posterior margin impunctate. Mesoscutum 0.77 (0.75-0.85, mean 0.80) X as long as wide, 0.82 (0.81-0.90, mean 0.90) X as wide as pronotum; entirely with sparse medium punctation, interspaces smooth and wider than puncture diameter, posterolaterally with dense coarse punctation; posterolateral corner raised as an angulate tooth. Scutellum trapezoidal, posteriorly convergent, entire dorsal surface with moderate to dense, coarse subcircular punctation. Dorsellum with

dense medium punctation, laterally ridged. Propodeum with areola longer than neighbouring areae. Mesepisternum with pit-like, shallow reticulations, reticulations approximately same size as those on anterior portion of lateral surface of pronotum, scrobe an indistinct subcircular shallow depression, mesepisternal groove absent. Mesosternum with anterior concavity transversely ridged, posteriorly becoming moderately punctate, punctures medium and ill-defined; no mesosternal processes.

Forewing: Pterostigma 0.53 (0.32-0.57, mean 0.46) X length of anterior margin of marginal cell. Marginal cell 3.75 (3.20-4.32, mean 3.86) X as long as wide, 1.34 (1.18-1.50, mean 1.34) X length of second submarginal. Second submarginal cell sessile anteriorly, 0.53 (0.47-0.64, mean 0.56) X length of discoidal cell. Third submarginal cell with vein 3r-m tubular anterior to junction with accessory vein, tubular, nebulous becoming absent posterior to junction with accessory vein; medial vein spectral; accessory vein nebulous, 1.2 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur simple with greatest width at midlength; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.66 (0.64-0.88, mean 0.74) X length of longer spur, longer spur almost straight; basitarsus straight. Hind leg: Coxa entirely with moderate medium punctation, interspaces subequal to puncture diameter, mesal margin with arched protruding ridge slightly angulated posteriorly, 0.5 X length of coxa, ventral surface convex; trochanter simple; femur with macrosetae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae sparsely but evenly distributed, shorter than shorter spur, shorter spur 0.67 (0.64-0.75, mean 0.68) X length of longer spur, longer spur almost straight, 0.69 (0.68-0.80, mean 0.74) X length of basitarsus; basitarsus with dense microsetae, macrosetae sparse, only on posterior margin and shorter than those on tibia, ventral surface with three rows of short stout spines.

Metasoma 1.11 (1.00-1.27, mean 1.06) X as long as wide. First segment moderately narrow and fairly long, slightly constricted at apex, 2.18 (2.08-2.49, mean 2.28) X as long as wide, 2.51 (2.42-2.80, mean 2.61) X as long as high, 1.04 (0.92-1.13, mean 1.02) X as long as T2; tergum, except tergulum, irregular with moderate, medium to coarse subcircular punctation, tergulum with moderate fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum with dense coarse punctation, without any distinct median carina. T2 0.88 (0.88-1.01, mean 0.93) X as long as wide, 1.08 (1.00-1.15, mean 1.06) X as wide as mesosoma, vestiture sparse, subdecumbent to suberect, almost entirely with moderate medium punctation becoming sparsely punctate posteriorly, interspaces smooth and subequal to puncture diameter, felt line 0.49 (0.40-0.52, mean 0.45) X length of tergum, length anterior to felt line 1.59 (1.41-2.07, mean 1.60) X

length of tergum posterior to felt line; S2 convex, setae evenly distributed and shorter than shorter mesotibial spur, anteriorly with moderate medium punctation, interspaces irregular and subequal to puncture diameter, mesal area without carina, posteriorly with sparse fine punctation, interspaces shiny and subequal to puncture diameter, felt line absent. Pygidium transverse, posterior margin square, anterior one-third with moderate dense punctation, interspaces smooth and subequal to puncture diameter, pygidial plate entirely with dense fine punctation, except anterolateral margin smooth; hypopygium with posterior margin convex, mesal area with longitudinal depression < 0.5 X length of sternum. Genitalia as in fig. 66.

FEMALE: Unknown.

MATERIAL EXAMINED

TYPE MATERIAL. Holotype: ♂, "[ALGERIA:] Zguilma-Saoura [30°50'N 4°03'E]/ Sahara N. O./ F. Pierre leg.// 14.v.1947" (MNCN).

Measured paratypes: 11♂: MOROCCO: [11]Fezzou, Mader Bouziane, 30°53'N 4°53'W, v.1953 (A. Reymond) (1♂, MNHN); [62, 3]Draa, Aouinet Torkoz, 28°29'N 9°52'W, vi.1965 (A. Pardo) (2♂, MNCN); [1]Draa, Tuisgui Remz, 28°23'58"N 9°13'28"W, v.1944 (J. Mateu) (1♂, MNCN); Saguia el Hamra, El Farsia, 27°06'N 9°50'W, 20.v.1942 (E. Morales) *det.* by Giner Mari as *T. aegyptiacus* Rad. (1♂, MNCN). MAURITANIA: [4, 5]Zemmour, Sbager, 25°52'N 11°52'W, 8.vi.1948 (2♂, MNHN). ALGERIA: [10]El Golea, 30°35'N 2°51'E (Surcouf) (1♂, MNHN); [7]Igli, Chab't el Karkor, 15 km N., 30°28'N 2°19'W, 14.v.1964 (J. Mateu) at a light (1♂, MNHN); [8, 9]Oued el ArFedj, 29°23'N 1°46'W, 21-23.v.1962 (J. Mateu) (2♂, MNHN).

MEASURED MATERIAL. 4♂: ALGERIA: [2]Hamman es Salahine, 34°53'N 5°36'E, 10.v.1903 (Wlsm. E. Saunders Coll. 1910. 266) (1♂, NHML); [3]Biskra, 34°51'N 5°44'E, vii.1973 (Stančič) (1♂, NONV); [1]Moraine, near Biskra, 34°50'N 5°41'E, 1910 (P. Chrétien) *det.* by R. du Buysson as *Tricholabiodes aegyptiacus* Rad. (1♂, MNHN). TUNISIA: [4]Sahara oranais, Abadla, 31°01'N 2°44'W, v.1950 (Reymond) *det.* as *semistriatus*, *det.* by Suárez as *Tricholabiodes saharicus* Suár. (1♂, MNHN). LIBYA: [5]Fezzan, Jebel Fezzan, 10 mls N. of Brak, 26°00'N 14°00'E, 12.v.1952 (K.M. Guichard, B.M. 1952-460) (1♂, NHML).

DISTRIBUTION

This species is distributed across the northwestern area of North Africa, with specimens recorded from Morocco, Mauritania, Algeria, Tunisia and Libya (fig. 83).

DISCUSSION

Suárez (1967) described this species from several males. His description is a diagnosis of the distinguishing characters, instead of a complete description. Even though the description is based on several specimens, Suárez failed to include intraspecific variation, nor did he provide a description of the genitalia. Suárez (1977, 1990) made two brief subsequent references to *T. saharicus*.

Tricholabiodes saharicus is most similar to *T. garamantis* from which it differs mainly in the shape of the free border of the clypeus and sculpturing on the mesal margin of the metacoxa. In *T. saharicus*, the free border of the clypeus has the mesal area truncated straight and the mesal margin of the metacoxa has an arched protruding ridge slightly angulated posteriorly. In *T. garamantis*, the free border of the clypeus is strongly convex with a rounded tubercle on each side of the midline and the mesial margin of the metacoxa has a slight, longitudinal carina smaller than 0.5 X length of the coxa. The genitalia of *T. saharicus* (fig. 66) is characteristic. The protuberance on the mesal margin of the volsellae is also found in *T. nonveilleri*, *T. marmaricus* and *T ferrugineus*. The shape of the protuberance is identical in all four species, but *T. saharicus* and *T. ferrugineus* have an oval volsellae, compared to the elongated volsellae found in the other two species (figs 30, 39, 42 & 66).

***Tricholabiodes pallidicornis* Bischoff, 1920.** ♂

[*Tricholabioides* [*sic*] *semistriata* [*sic*]] *pallidicornis* Bischoff, 1920:106. ♂
Tricholabioides [*sic*] *Patrizii* [*sic*] Invrea, 1932b:462, fig. 5. ♂ **syn. nov.**
[*Tricholabioides* [*sic*]] *patrizii* Invrea; Suárez, 1963:924, fig. 5. ♂
[*Tricholabioides* [*sic*]] *pallidicornis* Bischoff; Suárez, 1977:218. ♂
[*Tricholabioides* [*sic*]] *pallidicornis pallidicornis* Bischoff; Suárez, 1990:184, 186. ♂
[*Tricholabioides* [*sic*]] *pallidicornis patrizii* Invrea; Suárez, 1990: 185, 186, fig. 32. ♂

The values in square brackets refers to the holotype of *T. patrizii*.

DIAGNOSIS

MALE: Metasoma with T2-T6 pale yellowish-brown to dark reddish-brown, becoming paler posteriorly, sterna paler than corresponding terga. Free border of clypeus convex. Middle and inner mandibular teeth separated by distance subequal to width of apical tooth, inner tooth subrounded. Mesepisternum with scrobe present, mesepisternal groove absent. Mesosternum simple, no mesosternal processes. Second

submarginal cell sessile anteriorly. Mesobasitarsus slightly curved anteriorly. Mesal margin of metacoxa simple; ventral surface of metafemur with macrosetae clumped, ordered and parallel, macrosetae increasing in length distally with distal setae longer than shorter tibial spur but shorter than longer tibial spur. Metasoma with anterior mesal area of S2 without carina, S2 without felt line. Pygidial plate entirely smooth although surface slightly irregular; hypopygium with posterior margin convex, mesal area with longitudinal depression < 0.5 X length of sternum. Genitalia as in fig 63.

REDESCRIPTION

MALE: Length 7.36 ([10.23] 7.36–12.12, mean 10.61) mm. Head, including clypeus and antenna, pale yellowish-brown, sometimes antenna golden yellow; mandible almost entirely pale yellowish-brown, apex black, ventral tooth pale reddish-brown; mesosoma and legs, including coxae and tibial spurs, pale to medium yellowish-brown; forewing lightly infuscated posterior to marginal cell; pterostigma and wing veins pale yellowish-brown, sometimes wing veins golden yellow; metasoma with T1 entirely pale to medium yellowish-brown, T2-T6 pale yellowish-brown to dark reddish-brown, becoming paler posteriorly, sterna paler than corresponding terga.

Head 1.54 ([1.49] 1.40–1.54, mean 1.47) X as wide as long, 1.01 ([0.91] 0.91–1.01, mean 0.95) X as wide as mesosoma, 1.49 ([1.54] 1.47–1.59, mean 1.52) X as wide as vertex, 1.35 ([1.36] 1.35–1.55, mean 1.43) X as long as compound eye, sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with sparse fine punctation, interspaces shiny and wider than puncture diameter; foveola deep; surface between median ocellus and foveola without longitudinal median groove though slightly longitudinally depressed, between toruli longitudinal median groove subrounded in section and shallow; scrobal carina arcuate, not reaching scrobal tubercle but sometimes indistinct; antennal tubercle simple, with sparse fine punctation. Vertex 0.60 ([0.66]0.60–0.70, mean 0.65) X as long as wide, 1.50 ([1.38]1.31–1.50, mean 1.38) X as wide as frons; posterior to lateral ocellus with moderate fine punctation, interspaces shiny and subequal to puncture diameter. Compound eye with ommatidia distinct. Ocelli large, convex and broadly oval, median ocellus 0.86 ([0.89] 0.79–0.90, mean 0.83) X as long as wide, interocellar distance 1.62 ([1.14] 1.10-1.62, mean 1.26) X ocellocular distance. Gena with dense coarse punctation, sometimes with punctures decreasing in density and size posteriorly. Clypeus 0.41 ([0.43] 0.38–0.45, mean 0.40) X as high as wide, free border convex; central portion raised and slightly convex, with sparse fine punctation, interspaces > 2 X puncture diameter; vestiture length subequal to height of clypeus, inconspicuous. Mandible higher than thick, dorsal rim with carina along entire length, ending at base of inner tooth; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth separated by

distance subequal to width of apical tooth, inner tooth subrounded; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 0.88 ([0.89] 0.81–0.99, mean 0.91) X height at base. Antenna with scape 2.59 ([2.25] 2.21–2.47, mean 2.38) X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere simple; second flagellomere 1.56 ([1.41] 1.18–1.56, mean 1.41) X length of first, 0.99 ([1.06] 0.93–1.13, mean 0.99) X length of third.

Mesosoma, excluding anterior collar, 1.59 ([1.69] 1.55–1.72, mean 1.64) X as long as wide. Pronotum 0.92 ([0.86] 0.86–0.96, mean 0.89) X as wide as mesosoma, anterodorsal surface with dense medium punctation mesally becoming pit-like shallow reticulations laterally, strongly convex, humeral angle subrounded; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct and almost as large as a reticulation; posterior portion of lateral surface irregular with sparse fine punctation, posterior margin impunctate. Mesoscutum 0.81 ([0.79] 0.77–0.84, mean 0.82) X as long as wide, 0.77 ([0.85] 0.77–0.94, mean 0.89) X as wide as pronotum; between notauli with sparse medium punctation, interspaces smooth and wider than puncture diameter; laterally with moderate medium punctation, posterolaterally with dense coarse punctation; posterolateral corner raised as an angulate tooth. Scutellum trapezoidal, posteriorly convergent, entire dorsal surface densely covered with coarse subcircular punctation. Dorsellum with dense medium punctation, laterally simple, although edges of lateral punctures may give the impression that dorsellum is laterally ridged. Propodeum with areola longer than neighbouring areae. Mesepisternum with pit-like, shallow reticulations, reticulations approximately same size as those on anterior portion of lateral surface of pronotum, scrobe an indistinct subcircular depression, mesepisternal groove absent. Mesosternum with anterior concavity nearly impunctate, shiny, posteriorly becoming moderately punctate, punctures medium and ill-defined; no mesosternal processes.

Forewing: Pterostigma 0.41 ([0.39] 0.39–0.71, mean 0.50) X length of anterior margin of marginal cell. Marginal cell 3.22 ([3.64] 3.22–4.06, mean 3.62) X as long as wide, 1.45 ([1.18] 1.18–1.57, mean 1.40) X length of second submarginal. Second submarginal cell sessile anteriorly, 0.50 ([0.50] 0.49–0.80, mean 0.60) X length of discoidal cell. Third submarginal cell with vein 3r-m tubular anterior to junction with accessory vein, nebulous becoming absent posterior to junction with accessory vein; medial vein absent; accessory vein nebulous, 1.25 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur simple with greatest width at midlength; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.90 ([0.70] 0.66–0.90, mean 0.74) X length of longer

spur, longer spur almost straight; basitarsus slightly curved anteriorly. Hind leg: Coxa entirely with moderate medium punctation, interspaces subequal to puncture diameter, mesal margin simple, although edges of lateral punctures may give the impression of a slightly broken carina, ventral surface convex; trochanter simple; femur ventral surface with macrosetae clumped, ordered and parallel, macrosetae increasing in length distally with distal setae longer than shorter tibial spur but shorter than longer tibial spur, remainder of femur with sparse pilose setae; tibial macrosetae sparsely but evenly distributed, shorter than shorter spur, shorter spur 0.58 ([0.60] 0.58–0.75, mean 0.70) X length of longer spur, longer spur almost straight, 0.80 ([0.73] 0.70–0.88, mean 0.75) X length of basitarsus; basitarsus with dense microsetae, macrosetae only on posterior surface, shorter than those on tibia, ventral surface with several unordered rows of short stout spines.

Metasoma 1.26 ([1.09] 1.03–1.36, mean 1.15) X as long as wide. First segment moderately narrow and fairly long, slightly constricted at apex, 2.11 ([2.10] 1.98-2.28, mean 2.16) X as long as wide, 2.82 ([2.63] 2.59–2.83, mean 2.74) X as long as high, 0.99 ([1.00] 0.98–1.15, mean 1.01) X as long as T2; tergum, except for tergulum, densely covered with subcircular coarse punctures, tergulum with sparse to moderate, fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum densely covered with coarse punctures, median carina absent. T2 0.95 ([0.95] 0.85–0.99, mean 0.95) X as long as wide, 1.00 ([0.98] 0.97–1.10, mean 1.02) X as wide as mesosoma, vestiture sparse, subdecumbent to suberect, anterior one-third with dense coarse punctation, interspaces irregular and narrower than puncture diameter, posterior two-thirds shallowly and moderately punctate, interspaces shiny and subequal to puncture diameter, felt line 0.45 ([0.43] 0.37–0.48, mean 0.43) X length of tergum, length anterior to felt line 2.00 ([1.30] 1.29–2.00, mean 1.60) X length of tergum posterior to felt line; S2 convex, setae evenly distributed and shorter than shorter mesotibial spur, anteriorly with dense coarse punctation, interspaces irregular and narrower than puncture diameter, mesal area without carina, posteriorly with moderate medium punctation, interspaces shiny and subequal to puncture diameter, felt line absent. Pygidium transverse, posterior margin strongly convex, anterior one-third irregular and moderately punctate, interspaces subequal to puncture diameter, pygidial plate entirely smooth although surface slightly irregular; hypopygium with posterior margin convex, mesal area with longitudinal depression > 0.5 X length of sternum. Genitalia as in fig. 63.

FEMALE: Unknown.

MATERIAL EXAMINED

TYPE MATERIAL. Holotype: (*T. pallidicornis*): ♂, "[ALGERIA]: S.O. Algerien iv./ Tig'amaiin-en-

tisita [Locality not known] / 25.-30.14v. Geyr S.G."; "*pallidicornis* / Typ. *Trich*[*olabiodes*] / *det.* Bischoff"; "Type" (ZMHB).

Holotype (*T. patrizii*): ♂, "Miss. Zool. aCufra / Fa'a ES. Sahabi / El Hasera [Locality not known] / vii.1931"; "Typus"; "*Tricholabio-* / *ides* [*sic*] n.sp. / det Bischoff"; "*Tricholabioides* [*sic*] / *Patrizii* [*sic*] n.sp. / Typus / *Determ.* F. Invrea" (MCSN).

MEASURED MATERIAL. 10♂: TUNISIA: [2]Tozeur, 33°55'N 8°08'E (Santschi) (1♂, MNHN). ALGERIA: [5]South Algeria, S. of Ghardaïa, 32°29'N 3°40'E, 20-30.v.1912 (Hartert & Hilg., Brit. Mus. 1930-47) *det.* as *Mutilla* (*Tricholabiodes*) *aegyptiacus* Rad. (1♂, NHML); [3]Sahara oranais, Abadla, 31°01'N 2°44'W, v.50 (Reymond) *det.* as *T. semistriata* (1♂, MNHN); [4]Sahara Algérien, Oued el Arfedji, 29°23'N 1°46'W, 21-23.v.1962 (J. Mateu) *det.* by Suárez as *Tricholabiodes pallidicornis* Bisch. (1♂, ZMHB); [1]Fort Gardel, 24°52'N 8°26'E, 1950 (Manvaër) (1♂, MNHN). LIBYA: [6]Daho (Tuat), 28.iv.1951 (J. Mateu) (1♂, MNCN); [9]Mizdah, 31°26'N 12°59'E, vii.1914 (G.O. Kruger), *det.* by Invrea as *Tricholabiodes semistriatus* Kl, *det.* by Suárez as *Tricholabiodes pallidicornis* Bis. (1♂, MNCN). NIGER: [7]Aïr Massif, Taghmeurt, 18°50'N 9°10'E, 27.viii.1983 (P.C. Matteson) (1♂, UCDC); [8]Aïr Massif, Taquei, 18°43'N 8°41'E, 26.viii.1983 (Patricia C. Matteson) riparian vegetation, light trap (1♂, NHML). TOGO: [10]Mono, 8°27'N 1°14'E, 1941 (F. Bernard) (1♂, MNHN).

ADDITIONAL MATERIAL. 9♂: TUNISIA: Tozeur, 33°55'N 8°08'E, 1.x.1903 (1♂, MNHN), (Santschi) (1♂, MNHN); Neftah, 33°52'N 7°53'E, v.1927 (C. Dumont), caught at light, *det.* by Invrea as *Tricholabiodes semistriatus* Kl., *det.* by Suárez as *Tricholabiodes pallidicornis* Bisc. (1♂, MNHN). ALGERIA: South Algeria, S. of Ghardaïa, 32°29'N 3°40"E, 20-30.v.1912 (Hartert & Hilg., Brit. Mus. 1930-47) *det.* as *Mutilla* (*Tricholabiodes*) *aegyptiacus* Rad. (1♂, NHML); Sahara Algéries, Beni Abbes, 30°08'N 2°10'W, 15.vii.1947 (F. Pierre) (1♂, MNCN). LIBYA: Fezzan, Sabha, 27°20'N 14°15'E, 21.v.45 (F. Bernard) (1♂, MNHN). MAURITANIA: Edderoum-Tagant, 18°20'N 11°32'W, 22.iii.1958 (J. Mateu) (1♂, MNCN). NIGER: Aïr Massif, Zomo, 18°28'N 8°57'E, 30.viii.1983 (P.C. Matteson) (1♂, UCDC). CHAD: Rive, S.E., v-vi.1910 (Dr R. Gaillard) *det.* by Invrea as *Tricholabiodes* sp. ? (1♂, MNHN).

DISTRIBUTION

This species is distributed across western North Africa, with specimens recorded from Tunisia, Algeria, Libya, Mauritania, Niger, Chad and Togo (fig. 83).

DISCUSSION

Small differences in size, colour and sculpturing of this species led to the description of two synonymies, *T. pallidicornis* and *T. patrizii*. Bischoff (1920) described *pallidicornis* as a subspecies of *Tricholabiodes semistriatus*, basing his description on forewing venation and body sculpturing. Intraspecific variation in colour and punctation led Invrea (1932b) to describe a morphological variant, *T. patrizii*, as a separate species.

Tricholabiodes pallidicornis and *T. patrizii*, except for slight variation in coloration and differences in sculpturing, are identical. Not enough specimens have been collected to fully ascertain the geographical distribution of *T. pallidicornis* and *T. patrizii*, but it does appear as if their distributions overlap. *T. patrizii* is here determined as a junior synonym of *T. pallidicornis*.

This species is most similar to *T. recurvatus* from which it differs in the shape of the free border of the clypeus, shape of the anterodorsal margin of the pronotum and mesobasitarsus, sculpturing of the mesal margin of the metacoxa, and the length and distribution of the macrosetae on the metafemur. In *T. pallidicornis*, the free border of the clypeus has the mesal margin convex, the anterodorsal margin of the pronotum is strongly convex, the mesobasitarsus is slightly anteriorly curved, the mesal margin of the metacoxa is simple and the macrosetae of the metafemur are comb-like on the ventral surface with the distal setae longer than the shorter metatibial spur. In *T. recurvatus*, the free border of the clypeus has the mesal margin protruding in a weak arch, which is notched on either side of the midline, forming a weak denticle, the anterodorsal margin of the pronotum is slightly convex, the mesobasitarsus is straight, the mesal margin of the metacoxa has an arched protruding ridge and the macrosetae of the metafemur is evenly distributed and shorter than the shorter metatibial spur. The genitalia of both species (figs 31 & 63) are very characteristic.

***Tricholabiodes niloticus niloticus* Suárez, 1967. ♂**

Tricholabioides [*sic*] *niloticus* Suárez, 1967:569. ♂

[*Tricholabioides* [*sic*]] *niloticus* Suár[ez]; Suárez, 1977:218. ♂

Tricholabioides [*sic*] *niloticus* Suárez; Suárez, 1990:144, 185, 186, figs 1(d), 2(c), 3(b), 4(m, n), 5(d), 6(I), 16, 18. ♂

DIAGNOSIS

MALE: Metasoma with T1 entirely medium yellowish-brown, T2-T6 dark reddish-brown, becoming paler posteriorly, sterna paler than corresponding terga. Head with sides behind compound eyes distinctly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with scrobal carina absent. Free border of clypeus strongly convex. Middle and inner mandibular teeth separated by distance subequal to width of apical tooth, inner tooth acute. Mesal margin of metacoxa simple; basitarsus with macrosetae only on posterior margin and shorter than those on tibia. Metasoma with anterior one-third of T2 with moderate medium punctation, interspaces shiny and subequal to puncture diameter; anterior mesal area of S2 with slight carina < 0.5 X length of sternum, S2 with felt line. Pygidium with anterior one-third with moderate dense punctation, interspaces smooth, pygidial plate entirely with dense fine punctation, except anterolateral margin smooth; hypopygidium with mesal area simple. Genitalia as in fig. 70.

REDESCRIPTION

MALE: Length 10.31 (8.68-13.52, mean 10.77) mm. Head, including clypeus and antenna, pale yellowish-brown; mandible almost entirely pale yellowish-brown, apex black, ventral tooth dark yellowish-brown to pale reddish-black; mesosoma medium yellowish-brown; legs, including coxae and tibial spurs, pale yellowish-brown; forewing lightly infuscated posterior to pterostigma; pterostigma and wing veins pale yellowish-brown; metasoma with T1 entirely medium yellowish-brown, T2-T6 dark reddish-brown, becoming paler posteriorly, sterna paler than corresponding terga; entire body, particularly the metasoma, covered with long, pallid setae.

Head 1.43 (1.36-1.50, mean 1.45) X as wide as long, 0.94 (0.90-1.03, mean 0.97) X as wide as mesosoma, 1.52 (1.50-1.65, mean 1.56) X as wide as vertex, 1.46 (1.31-1.59, mean 1.42) X as long as compound eye, sides behind compound eyes distinctly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with sparse fine punctation, interspaces shiny and wider than puncture diameter; foveola deep; surface between median ocellus and foveola smooth without longitudinal median groove, between toruli longitudinal median groove subrounded in section and shallow; scrobal carina absent; antennal tubercle simple, sparsely and finely punctate. Vertex 0.70 (0.61-0.77, mean 0.68) X as long as wide, 1.34 (1.23-1.43, mean 1.33) X as wide as frons; posterior to lateral ocellus with sparse fine punctation, interspaces shiny and wider than puncture diameter. Compound eye with ommatidia distinct. Ocelli large, convex and broadly oval, median ocellus 0.78 (0.76-0.94, mean 0.88) X as long as wide, interocellar distance 1.28 (1.21-1.69, mean 1.53) X ocellocular distance. Gena with sparse medium punctation, interspaces irregular. Clypeus 0.46

(0.33-0.42, mean 0.38) X as high as wide, free border strongly convex; central portion raised and slightly convex, sparsely and finely punctate, interspaces 3 X puncture diameter; vestiture length longer than height of clypeus, inconspicuous. Mandible higher than thick, dorsal rim with carina along entire length, ending at base of inner tooth; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth separated by distance subequal to width of apical tooth, inner tooth acute; mesal margin smooth; ventral tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 0.86 (0.80-0.96, mean 0.88) X height at base. Antenna with scape 2.11 (1.58-2.11, mean 1.93) X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere simple; second flagellomere 1.36 (1.16-1.47, mean 1.33) X length of first, 1.03 (0.90-1.10, mean 1.01) X length of third.

Mesosoma, excluding anterior collar, 1.68 (1.57-1.79, mean 1.66) X as long as wide. Pronotum 0.90 (0.86-0.93, mean 0.90) X as wide as mesosoma, anterodorsal surface with moderate medium punctation mesally becoming pit-like, shallow reticulations laterally, strongly convex, humeral angle subrounded; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct and almost as large as a reticulation; posterior portion of lateral surface with either sparse fine punctation, interspaces irregular and wider than puncture diameter, or often roughly striated with sparse fine punctation between striations, posterior margin impunctate. Mesoscutum 0.84 (0.76-0.84, mean 0.80) X as long as wide, 0.81 (0.83-0.94, mean 0.85) X as wide as pronotum; between notauli with moderate medium punctation, interspaces smooth and subequal to puncture diameter; laterally with sparse medium punctation, posterolaterally with dense coarse punctation; posterolateral corners raised as an angulate tooth. Scutellum subsquare, entire dorsal surface moderately to densely covered with coarse subcircular punctation. Dorsellum with dense medium punctation, laterally simple, although edges of lateral punctures may give the impression that dorsellum is laterally ridged. Propodeum with areola shorter than neighbouring areae. Mesepisternum with pit-like, shallow reticulations, reticulations approximately same size as those on anterior portion of lateral surface of pronotum, scrobe an indistinct subcircular depression, mesepisternal groove absent. Mesosternum with anterior concavity nearly impunctate, shiny, posteriorly smooth; no mesosternal processes.

Forewing: Pterostigma 0.58 (0.32-0.61, mean 0.50) X length of anterior margin of marginal cell. Marginal cell 3.53 (3.17-4.21, mean 3.61) X as long as wide, 1.31 (1.23-1.68, mean 1.44) X length of second submarginal. Second submarginal cell sessile anteriorly, 0.49 (0.43-0.63, mean 0.50) X length of discoidal cell. Third submarginal cell with vein 3r-m nebulous anteriorly, absent posteriorly; medial vein spectral; accessory vein nebulous, 1.4 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur simple with greatest width at midlength; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.75 (0.63-0.81, mean 0.74) X length of longer spur, longer spur almost straight; basitarsus straight. Hind leg: Coxa anteriorly with sparse medium punctation, posteriorly becoming moderately to densely punctate, mesal margin simple, ventral surface convex; trochanter simple; femur with macrosetae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae only on posterior surface with several setae anteriorly, shorter than shorter spur, shorter spur 0.69 (0.60-0.80, mean 0.68) X length of longer spur, longer spur almost straight, 0.68 (0.62-0.82, mean 0.73) X length of basitarsus; basitarsus with dense microsetae, macrosetae only on posterior margin and shorter than those on tibia, ventral surface with two, often indistinct, rows of short stout spines.

Metasoma 1.20 (1.00-1.47, mean 1.27) X as long as wide. First segment moderately narrow and fairly long, slightly constricted at apex, 2.18 (2.00-2.64, mean 2.38) X as long as wide, 2.45 (2.54-3.03, mean 2.79) X as long as high, 1.01 (0.90-1.24, mean 1.03) X as long as T2; tergum, except tergulum, with dense coarse subcircular punctation, tergulum with moderate fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum with dense coarse punctation, median carina absent. T2 0.87-1.00 (mean 0.95) X as long as wide, 1.03 (0.91-1.11, mean 1.03) X as wide as mesosoma, vestiture sparse, anterior one-third with moderate medium punctation, interspaces shiny and subequal to puncture diameter, posterior two-thirds shallowly and sparsely punctate, interspaces shiny and wider than puncture diameter, felt line 0.53 (0.38-0.54, mean 0.46) X length of tergum, length anterior to felt line 1.11 (0.99-1.67, mean 1.38) X length of tergum posterior to felt line; S2 convex, setae evenly distributed and shorter than shorter mesotibial spur, anteriorly with moderate medium punctation, interspaces irregular and narrower than puncture diameter, mesal area with slight carina, < 0.5 X length of sternum, posteriorly with moderate fine punctation, interspaces shiny and wider than puncture diameter, felt line 0.15 X length of upper felt line. Pygidium transverse, posterior margin strongly convex, anterior one-third with moderate to dense punctation, interspaces smooth and subequal to puncture diameter, pygidial plate entirely with dense fine punctation, except anterolateral margin smooth; hypopygium with posterior margin convex, mesal area simple. Genitalia as in fig. 70.

FEMALE: Unknown.

MATERIAL EXAMINED

TYPE MATERIAL. Holotype: ♂, "[EGYPT:] Helwan Eg. [29°51'N 31°20'E] / 17.7.[19]33 / W.

Wittmer"; "coll. Museo ent. / 'Pietro Rossi' / Duino"; "*Trichola* [*biodes*] / *aegyptiaca* [*sic*] / Rad[oszkowski] / Determ.[ine] F. Invrea" (MCSN).

Measured paratypes: 9♂: EGYPT: [8,9]Fym., Kom Oshim, 29°31'N 30°54'E, 29.iv.1965 (K.V. Krombein) collected at light (1♂, NMNH), (1♂, MNCN), [4,5,6,7]25.v.1965 (K.V. Krombein) collected at light (3♂, NMNH), (1♂, MNCN); [1,2]El Kharga, Kharga Oasis, 25°15'N 30°35'E, 7.v.1965 (K.V. Krombein) collected at light (2♂, NMNH). [3]MAURITANIA: Taghad el Ouassa, Cercle Kiffa, 17°00'N 11°49'W, 2.iii.1958 (J. Mateu) (1♂, MNCN).

MEASURED MATERIAL. 5♂: LIBYA: [5]Tibesti, Wadi Wour, 25°31'N 18°11'E, 7.iii.1953 (K.M. Guichard, B.M. 1953-315) (1♂, NHML). EGYPT: [3]Baharein, 11.vi.1935 (J. Omer-Cooper, Armstrong College Expedition, B.M. 1935-354) (1♂, NHML); [4]Siwa, 29°11'N 25°31'E, 1.v.1935 (J. Omer-Cooper, Armstrong College Expedition, B.M. 1935-354) (1♂, NHML). NIGER: [1]Aïr Massif, Taquei, 18°43'N 8°41'E, 26.viii.1983 (Patricia C. Matteson) riparian vegetation, light trap (1♂, NHML). NIGERIA: [2]Logomani, 12°12'N 14°10'E, 26.iv.1951 (J.L. Gregory) at light (1♂, NHML).

ADDITIONAL MATERIAL. 11♂: EGYPT: Siwa, 29°11'N 25°31'E, 20-21.v.1935 (J. Omer-Cooper, Armstrong College Expedition, B.M. 1935-354) (1♂, NHML). NIGER: Aïr Massif, Iberkom, 18°55'N 8°40'E, 22.viii.1983 (P.C. Matteson) (1♂, UCDC); Aïr Massif, Taquei, 18°43'N 8°41'E, 26.viii.1983 (Patricia C. Matteson) riparian vegetation, light trap (2♂, NHML). SUDAN: Transjorania, Wadi Debba, 18°02'N 30°56'E, ix-x (Theodor) *det.* as *T. aegyptiacus* (1♂, MNCN). NIGERIA: Logomani, 12°12'N 14°10'E, 25.iv.1951 (J.L. Gregory) at light (1♂, NHML); Dikwa, 12°02'N 13°55'E, 16.ii.1951 (J.L. Gregory) at light (1♂, NHML). ETHIOPIA: Abyssinia, 8°00'N 38°00'E (Courbon, 16/61) *det.* by André as *Mutilla* (*Tricholabiodes*) *aegyptiaca* Rad. (1♂, MNHN). IRAN: Wais, 31°28'29"N 48°53'26"E, 1950 (T.Leije) *det.* as *semistriatus*, *det.* by Suárez as *T. niloticus* Suár? (1♂, MNHN). ISRAEL: Simari Fiream, 28.ix.1977 (A. Freidberg) *det.* by Petersen as *Tricholabiodes niloticus* Suárez (1♂, TAUI). SAUDI ARABIA: Mujairima, 75 m. S. of Jedda, 20°36'N 39°36'E, I.1945 (Dr. B.P. Uvarov, Brit. Mus. 1946-347) (3♂, NHML).

DISTRIBUTION

This species occurs across North Africa and southwestern Asia, with specimens recorded from Libya, Egypt, Niger, Mauritania, Nigeria, Sudan, Ethiopia, Iran, Israel and Saudi Arabia (fig. 84).

DISCUSSION

Suárez (1967) described this species, basing his description on 29 specimens and designating the

specimen caught by W. Wittmer as the holotype. Suárez, (1977) briefly referred to *T. n. niloticus* during a comparative discussion of *T. nonveilleri*, and later redescribed it (Suárez 1990), providing drawings of distinct morphological characters and genitalia. Even though both descriptions (Suárez 1967, 1990) were detailed and accurate, so that this species could be unambiguously identified, it has been redescribed here in order to provide further comparative information.

This species is most similar to *T. indistinctus* from which it differs mainly in the shape of the free border of the clypeus, presence of a carina on the dorsal rim of the mandibles, sculpturing of the dorsellum and the mesal margin of the metacoxa, presence of the felt lines on S2, sculpturing on the mesal area of the hypopygium and shape of the genitalia (figs 69 & 70). In *T. n. niloticus*, the free border of the clypeus is strongly convex, the dorsal rim of the mandibles has a carina along the entire length, and the mesal margin of the metacoxa and mesal area of the hypopygium is simple. In *T. indistinctus*, the free border of the clypeus is strongly convex with very slight protuberances on either side of the midline, the dorsal rim of the mandibles has a carina only on the proximal half, the mesal margin of the metacoxa has a longitudinal carina greater than 0.6 X length of the coxa and the mesal area of the hypopygium has a longitudinal depression smaller than 0.5 X length of the sternum.

***Tricholabiodes arabicus* Suárez, 1967. ♂**

[*Mutilla* (*Tricholabiodes*)] *semistriata* Klug; André, 1903:174-175 (misidentification). ♂
Tricholabioides [*sic*] *semistriata* [*sic*] (Klug); Invrea, 1965:61 (misidentification). ♂
Tricholabioides [*sic*] *aegyptiaca* [*sic*] (Rad[oszkowski]); Invrea, 1965:62 (misidentification). ♂
Tricholabioides [*sic*] *arabicus* Suárez, 1967:568. ♂
Tricholabioides [*sic*] *arabicus* Suárez; Suárez, 1990:126, 185, 186, figs 1(a), 2(a), 3(c), 4(d), 5(a), 6(b), 8, 12. ♂

DIAGNOSIS

MALE: Metasoma with T1 entirely medium yellowish-brown with narrow pale reddish-brown band at apex, T2-T6 dark reddish-brown, becoming paler posteriorly, sterna paler than corresponding terga. Head with sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Free border of clypeus strongly convex. Middle and inner mandibular teeth separated by distance half width of apical tooth, inner tooth subrounded. Dorsellum with dense ill-defined punctation, laterally ridged. Mesepisternum with scrobe present, mesepisternal groove absent;

no mesosternal processes. Mesal margin of metacoxa with longitudinal carina 0.5 X length of coxa, posteriorly carina finished in a denticle; tibia with macrosetae evenly distributed, longer than shorter spur, shorter than longer spur. Metasoma with anterior one-third of T2 with longitudinal rectangular reticulations, with sparse fine punctation within each reticulation; anterior mesal area of S2 with slight carina < 0.5 X length of sternum, S2 with felt line. Pygidium with pygidial plate anteriorly smooth although surface slightly irregular, posteriorly with dense fine punctation; hypopygidium with mesal area simple. Genitalia as in fig. 67.

REDESCRIPTION

MALE: Length 8.23 (8.22-12.87, mean 10.43) mm. Head, including clypeus and antenna, pale to medium yellowish-brown; mandible almost entirely pale yellowish-brown, apex black, ventral tooth pale reddish-black; mesosoma medium yellowish-brown; legs, including coxae and tibial spurs, pale yellowish-brown; forewing lightly infuscated posterior to marginal cell; pterostigma and wing veins pale yellowish-brown; metasoma with T1 entirely medium yellowish-brown with narrow pale reddish-brown band at apex, T2-T6 dark reddish-brown, becoming paler posteriorly, sterna paler than corresponding terga; entire body covered with long, pallid setae.

Head 1.45 (1.41-1.49, mean 1.46) X as wide as long, 0.95 (0.90-1.05, mean 0.99) X as wide as mesosoma, 1.55 (1.48-1.63, mean 1.56) X as wide as vertex, 1.40 (1.32-1.43, mean 1.36) X as long as compound eye, sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with sparse fine punctation, interspaces shiny and wider than puncture diameter; foveola deep; surface between median ocellus and foveola smooth, without longitudinal median groove though slightly longitudinally depressed, between toruli longitudinal median groove subrounded in section and shallow; scrobal carina arcuate, not reaching scrobal tubercle; antennal tubercle simple, with sparse fine punctation. Vertex 0.65 (0.59-0.79, mean 0.70) X as long as wide, 1.30 (1.23-1.45, mean 1.34) X as wide as frons; posterior to lateral ocellus with sparse to moderate, fine punctation, interspaces shiny and subequal to puncture diameter. Compound eye with ommatidia distinct. Ocelli large, convex and broadly oval, median ocellus 0.78 (0.71-0.95, mean 0.83) X as long as wide, interocellar distance 1.15 (1.09-1.54, mean 1.36) X ocellocular distance. Gena with moderate, fine to medium punctation, interspaces irregular. Clypeus 0.40 (0.37-0.42, mean 0.39) X as high as wide, free border strongly convex; central portion raised and slightly convex, with sparse fine punctation, interspaces > 2 X puncture diameter; vestiture length longer than height of clypeus. Mandible higher than thick, dorsal rim with carina along entire length, ending at base of inner tooth; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth separated by

distance half width of apical tooth, inner tooth subrounded; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 0.90 (0.81-0.94, mean 0.90) X height at base. Antenna with scape 1.75 (1.72-2.32, mean 2.05) X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere simple; second flagellomere 1.20 (1.15-1.50, mean 1.37) X length of first, 0.90 (0.85-1.18, mean 1.02) X length of third.

Mesosoma, excluding anterior collar, 1.60 (1.54-1.73, mean 1.63) X as long as wide. Pronotum 0.91 (0.89-0.94, mean 0.93) X as wide as mesosoma, anterodorsal surface with dense ill-defined punctation mesally, becoming pit-like shallow reticulations laterally, strongly convex, humeral angle subrounded; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct and almost as large as a reticulation; posterior portion of lateral surface rough striated, posterior margin impunctate. Mesoscutum 0.80 (0.76-0.85, mean 0.80) X as long as wide, 0.85 (0.80-0.87, mean 0.83) X as wide as pronotum; between notauli with moderate, fine to medium punctation, interspaces smooth and subequal to puncture diameter; laterally with sparse, fine to medium punctation, posterolaterally with dense coarse punctation; posterolateral corner raised as an angulate tooth. Scutellum subsquare, entire dorsal surface sparsely to densely covered with medium subcircular punctation. Dorsellum with dense ill-defined punctation, laterally ridged. Propodeum with areola longer than neighbouring areae. Mesepisternum with pit-like, shallow reticulations, anterior reticulations smaller than those on anterior portion of lateral surface of pronotum, posterior reticulations approximately same size as those on anterior portion of lateral surface, scrobe an indistinct subcircular depression, mesepisternal groove absent. Mesosternum with anterior concavity transversely ridged, posteriorly with sparse to moderate punctation, punctures medium and ill-defined; no mesosternal processes.

Forewing: Pterostigma 0.40 (0.38-0.65, mean 0.46) X length of anterior margin of marginal cell. Marginal cell 3.20 (3.15-4.45, mean 3.80) X as long as wide, 1.40 (1.22-1.60, mean 1.39) X length of second submarginal. Second submarginal cell sessile anteriorly, 0.50 (0.41-0.62, mean 0.49) X length of discoidal cell. Third submarginal cell with vein 3r-m tubular anterior to junction with accessory vein, initially tubular, then nebulous becoming spectral posterior to junction with accessory vein; medial vein spectral; accessory vein nebulous, 1.25 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur simple with greatest width at midlength; tibia simple with macrosetae longer than shorter spur, shorter than longer spur, shorter spur 0.70 (0.63-0.81, mean 0.70) X length of longer spur, longer spur almost straight; basitarsus straight. Hind leg: Coxa entirely with

moderate medium punctation, interspaces subequal to puncture diameter, mesal margin with longitudinal carina 0.5 X length of coxa, carina finished posteriorly in a denticle, ventral surface convex; trochanter simple; femur with macrosetae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae sparsely but evenly distributed, longer than shorter spur, shorter than longer spur, shorter spur 0.70 (0.65-0.82, mean 0.69) X length of longer spur, longer spur almost straight, 0.73 (0.71-0.83, mean 0.75) X length of basitarsus; basitarsus with dense microsetae, macrosetae only on posterior margin and shorter than those on tibia, ventral surface with two rows of short spines.

Metasoma 1.10 (1.04-1.39, mean 1.24) X as long as wide. First segment moderately narrow and fairly long, slightly constricted at apex, 2.00 (1.96-2.57, mean 2.27) X as long as wide, 2.50 (2.46-2.96, mean 2.70) X as long as high, 1.00 (0.93-1.07, mean 0.98) X as long as T2; tergum, except tergulum, with dense coarse subcircular punctation, tergulum with moderate fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum with dense coarse punctation, median carina irregular. T2 0.96 (0.94-1.03, mean 0.98) X as long as wide, 1.05 (1.00-1.08, mean 1.04) X as wide as mesosoma, vestiture subdecumbent to suberect, anterior one-third with longitudinal rectangular reticulations, with sparse fine punctation within each reticulation, posterior two-thirds shallowly and sparsely to moderately punctate, interspaces shiny and wider than puncture diameter, felt line 0.45 (0.42-0.59, mean 0.50) X length of tergum, length anterior to felt line 1.20 (1.13-1.76, mean 1.42) X length of tergum posterior to felt line; S2 convex, setae evenly distributed and shorter than shorter mesotibial spur, anteriorly with moderate to dense and medium to coarse punctation, interspaces narrower than puncture diameter, mesal area with slight carina < 0.5 X length of sternum, posteriorly with moderate medium punctation, punctures decreasing in size posteriorly, interspaces shiny and subequal to puncture diameter, felt line, if present, 0.15 X length of upper felt line. Pygidium transverse, posterior margin convex, anterior one-third irregular and moderately punctate, interspaces subequal to puncture diameter, pygidial plate anteriorly smooth although surface slightly irregular, posteriorly with dense fine punctation; hypopygium with posterior margin convex, mesal area simple. Genitalia as in fig. 67.

FEMALE: Unknown.

MATERIAL EXAMINED

TYPE MATERIAL. Holotype: ♂, "[YEMEN:] Arabia merid. / Hadhramaut [15°00'N 50°00'E] / leg. G. Scortecci"; "Zona costiera / Uadi el Barak / 28-29.III.1962"; "*Tricholabioides* [*sic*] / *semistriata* [*sic*] / kl. / Determ.[ine]. F. Invrea." (MCSN).

Measured paratypes: 2♂: YEMEN: [1]U. Ezone, 27.viii.1965 (Scortecci) (1♂, MNCN); Mafhaq, 15°06'07"N 43°54'10"E, 30.viii.1965 (Scortecci) (1♂, MNCN).

MEASURED MATERIAL. 21♂: EGYPT: [3]Sinai, Aïn Isla, 29°52'N 33°45'E, 9.iv.1940 (Alfieri) at light, *det.* as *semistriatus* (1♂, NMNH). SUDAN: [1]Khor Arbaat Delta, 19°48'N 37°03'E, 6.v.1926 (H.B. Johnson) (1♂, NHML). NIGER: [19]Aïr Massif, Taquei, 18°43'N 8°41'E, 26.viii.1983 (Patricia C. Matteson) riparian vegetation (1♂, NHML). DJIBOUTI: [8]Obock, 11°59'N 43°20'E, 1893 (M. Maindron) *det.* by André as *pedunculatus* Kl. (1♂, MNHN); [7]Djibouti, 11°36'N 43°09'E, 1909 (A. Bonhoure) (1♂, MNHN). ETHIOPIA: [12]Haut-Aouache, Endessa, ix.1908 (Maurice de Rothschild) *det.* as *T. aegyptiacus* Rad.(1♂, MNHN); [16]Diré Dawa, 9°35'N 41°50'E, vii.1942 (Meneghetti) (1♂, NMKE). SOMALIA: [2]Bulhar, 10°23'N 44°25'E, 2.iii.1949 (K.M. Guichard, B.M. 1951-406) (1♂, NHML). SAUDI ARABIA: [4]Khufaifiya, 24°54'27"N 44°43'05"E, 13.vi.1938 (H.St. J.B. Philby, B.M. 1938-615) (1♂, NHML); [21]Hejaz, Buraiman, 12 miles N. Jidda, 21°38'20"N 39°15'00"E, 8.xii.1944 (A.R. Waterston, B.M. 1947-349) (1♂, NHML); [5]Amwah, 18°44'N 43°38'E, 20.vi.1936 (H.St. J.B. Philby, B.M. 1937-228) (1♂, NHML); [20]Najran, 17°30'20"N 44°11'03"E, 10-11.vii.1936 (H.St. J.B. Philby, B.M. 1937-228) (1♂, NHML). OMAN: [9, 10, 11]nr Qurivat, 12 m, 23°14'N 58°55'E, 18.vi.1993 (M.D. Gallagher) to light in dunes (3♂, DJBC); [13, 14, 15, 17, 18]25 km NNW, 22°39'N 56°41'E, 26-27.iii.1994 (M.D. Gallagher & B.J. Tigar, MDG 8578) light trap (5♂, DJBC); [6]Wahiba Sands, 21°39'N 59°18'E, 4-5.x.1994 (M.D. Gallagher & G. Lovre, #8619) to light (1♂, DJBC).

ADDITIONAL MATERIAL. 40♂: EGYPT: Siwa, 29°11'N 25°31'E, 9.vii.1935 (J. Omer-Cooper, Armstrong College Expedition, B.M. 1935-354) (3♂, NHML); Garra, 27°59'N 33°44'E, 4.vii.1935 (J. Omer-Cooper, Armstrong College Expedition, B.M. 1935-354) (1♂, NHML). SUDAN: Khor Arbaat Delta, 19°48'N 37°03'E, iv-v.1926 (H.B. Johnson, Pres by Imp. Inst. Ent. B.M. 1935-30) in bed of Khor (1♂, NHML), 15.iv.1926 (H.B. Johnson, Pres. by Imp. Inst. Ent. B.M. 1935-50) at light (1♂, NHML), 17.iv-v.1926 (H.B. Johnson, Pres. by Imp. Inst. Ent. B.M. 1935-30) at light (1♂, NHML). SOMALIA: Bulhar, 10°23'N 44°25'E, 2.iii.1949 (K.M. Guichard, B.M. 1951-406) (3♂, NHML). SAUDI ARABIA: Wadi Luwai, 22.v.1938 (H.St. J.B. Philby, B.M. 1938-615) (1♂, NHML); Asir, Wadi Hijha, 12.viii.1944 (Pres. by Imp. Inst. Ent. B.M. 1950-96) (1♂, NHML); Shari, 27°15'10"N 43°23'58"E, 4.viii.1938 (H.St. J.B. Philby, B.M. 1938-615) (1♂, NHML); Wapar Faja, 26°32'10"N 49°53'17"E, 17-18.vi.1936 (H.St. J.B. Philby, B.M. 1937-228) (1♂, NHML); Junaina, 25°30`N 47°05`E, 12.vi.1938 (H.St. J.B. Philby, B.M. 1938-615) (2♂, NHML); Hadleramant, Wadi Irma, 25°18`N 47°05'E (G. Popov, B.M. 1953-446) (1♂, NHML); Mahdatha, 21°51'N 40°41'E, 18.v.1936 (H.St. J.B. Philby, B.M. 1936-521) (1♂, NHML); Mahdatha, 60 m N.E. of Mecca, 21°51'N 40°41'E, I.1945 (Dr. B.P. Uvarov,

Brit. Mus. 1946-347) (1♂, NHML); Hejaz, Buraiman, 12 miles N. Jidda, 21°38'20"N 39°15'00"E, 8.xii.1944 (A.R. Waterston, B.M. 1947-349) (1♂, NHML); Lith, 10 m. inland, 20°09'N 40°16'E, I.1945 (Dr. B.P. Uvarov) (1♂, NHML). OMAN: nr Qurivat, 12 m, 23°14'N 58°55'E, 18.vi.1993 (M.D. Gallagher) to light in dunes (13♂, DJBC); 25 km NNW, 22°39'N 56°41'E, 26-27.iii.1994 (M.D. Gallagher & B.J. Tigar, MDG 8578) light trap (10♂, DJBC). YEMEN: Haz, about 15 miles N.W. of San`a, ca 9200 ft, 15°30'54"N 44°00'E (H. Scott & E.B. Britton, B.M. 1938-246) (1♂, NHML); Hadhramaut, Er Riyeda el Kathini, 15°00'N 50°00'E, 28.xi.1934 (W.H. Ingrams, Brit. Mus. 1935-254) (1♂, NHML); Dhala, ca. 5000 ft, 13°42'N 44°44'E, 23-25.ix.1937 (H. Scott & E.B. Britton, B.M. 1938-246) taken at light (1♂, NHML).

DISTRIBUTION

This species occurs across central and eastern North Africa and southwestern Asia with specimens recorded from Egypt, Sudan, Niger, Djibouti, Ethiopia, Somalia, Saudi Arabia, Oman and Yemen (fig. 85).

DISCUSSION

Suárez (1967) described this species from 23 males, designating the best preserved specimen as the holotype. He later redescribed *T. arabicus* (Suárez 1990), including diagrams of characteristic morphological features and a detailed drawing of the genitalia.

André (1903), in redescribing *M. (Tricholabiodes) semistriata,* based his redescription on specimens from three different areas ("PATRIE: Egypte, Arabie, Obock [Djibouti]"). He provided no other information about the specimens, except for the three different collecting localities. I have studied a specimen from Obock ["...M. Maindron / Obock / 1893"; "*Mutilla* / (*Tricholaboides* [*sic*] / *pedunculata* Kl."; "ERN. ANDRÉ det."] which agrees with André's (1903) description. With this specimen matching André's (1903) description, both morphologically and geographically, and with André's determination label attached, it is assumed that André partly based his redescription on this specimen. This specimen is identified here as *T. arabicus*. Another specimen from Obock, with a similar determination label by André has been identified as *T. sudanensis*.

The specimens determined by Invrea (1965) as *T. semistriatus* and *T. aegyptiacus* are determined by Suárez (1967) as *T. arabicus* and form part of the type series.

This species has a lot of intraspecific variation, in particular the sculpturing on T2, the length and shape

of the carina on the mesal margin of the metacoxa and the presence of the felt line on S2. Not all specimens have the felt line on S2 present, nor is the carina on the mesal margin of the metacoxa consistent in shape and length. The genitalia (fig. 67), in particular the shape and size of the volsella, are extremely variable.

Tricholabiodes arabicus, although most similar to *T. saharicus* can easily be recognized by the following combination of characters: the free border of the clypeus is convex; the mesal margin of the metacoxa has a longitudinal carina finishing posteriorly in a denticle; the metatibia has the macrosetae longer than the shorter spur and the anterior mesal area of S2 has a slight carina. Alternatively, in *T. saharicus*, the mesal area of the free border of the clypeus is truncated straight, the mesal margin of the metacoxa has an arched protruding ridge slightly angulated posteriorly, the metatibia has the macrosetae shorter than the shorter spur and the anterior mesal carina of S2 is absent.

***Tricholabiodes indistinctus* sp. nov. ♂**

DIAGNOSIS

MALE: Body and appendages almost entirely golden yellow to pale yellowish brown, sometimes with T4-T6 darker than anterior segment. Free border of clypeus strongly convex with very slight but sometimes indistinct protuberance on each side of midline. Middle and inner mandibular teeth separated by distance subequal to width of apical tooth, inner tooth acute. Mesepisternum with scrobe and mesepisternal groove absent. Mesofemur simple. Mesal margin of metacoxa with longitudinal carina > 0.6 X length of coxa. Metasoma with anterior one-third of T2 with moderate coarse punctation, posterior two-thirds shallowly and moderately punctate; S2 convex with mesal area with slight carina, < 0.5 X length of sternum, S2 without felt line. Pygidium with pygidial plate entirely smooth although surface slightly irregular; hypopygium mesal area possibly with longitudinal depression < 0.5 X length of sternum. Genitalia as in fig. 69.

DESCRIPTION

MALE: Length 8.80 (6.75-9.89, mean 8.37) mm. Body and appendages almost entirely golden yellow to pale yellowish-brown, sometimes with T4-T6 darker than anterior segments; mandible with apex black, ventral tooth dark yellowish-brown; forewing very lightly infuscated posterior to marginal cell; entire body covered with long, pallid setae.

Head 1.39 (1.39-1.44, mean 1.44) X as wide as long, 1.04 (0.99-1.05, mean 1.03) X as wide as mesosoma, 1.49 (1.49-1.51, mean 1.51) X as wide as vertex, 1.39 (1.37-1.39, mean 1.38) X as long as compound eye, sides behind compound eyes distinctly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with sparse fine punctation, interspaces shiny and wider than puncture diameter; foveola deep; surface between median ocellus and foveola smooth, without longitudinal median groove, between toruli longitudinal median groove rounded in section and shallow; scrobal carina absent, scrobal tubercle small; antennal tubercle simple, with sparse fine punctation. Vertex 0.61 (0.61-0.67, mean 0.64) X as long as wide, 1.46 (1.36-1.46, mean 1.42) X as wide as frons; posterior to lateral ocellus with sparse fine punctation, interspaces shiny and wider than puncture diameter. Compound eye with ommatidia distinct. Ocelli large, convex and broadly oval, median ocellus 0.89 (0.82-0.89, mean 0.86) X as long as wide, interocellar distance 1.30 (1.00-1.30, mean 1.08) X ocellocular distance. Gena with sparse, fine to medium punctation, interspaces shiny. Clypeus 0.40 (0.40-0.42, mean 0.41) X as high as wide, free border strongly convex with very slight but sometimes indistinct, protuberance on either side of midline; central portion raised and slightly convex, with sparse fine punctation, interspaces > 2 X puncture diameter; vestiture length longer than height of clypeus. Mandible higher than thick, dorsal rim with carina only on proximal half; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth separated by distance subequal to width of apical tooth, inner tooth acute; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 0.94 (0.83-0.94, mean 0.86) X height at base. Antenna with scape 2.25 (2.14-2.29, mean 2.21) X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere simple; second flagellomere 1.52 (1.44-1.52, mean 1.48) X length of first, 1.09 (0.97-1.09, mean 1.04) X length of third.

Mesosoma, excluding anterior collar, 1.77 (1.72-1.77, mean 1.74) X as long as wide. Pronotum 0.93 (0.89-0.93, mean 0.91) X as wide as mesosoma, anterodorsal surface with ill-defined punctation mesally becoming pit-like shallow reticulations laterally, strongly convex, humeral angle subrounded; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct and almost as large as a reticulation; posterior portion of lateral surface roughly striated with sparse fine punctation, interspaces wider than puncture diameter, posterior margin impunctate. Mesoscutum 0.84 (0.73-0.84, mean 0.79) X as long as wide, 0.83 (0.82-0.86, mean 0.84) X as wide as pronotum; between notauli with moderate medium punctation, interspaces irregular and subequal to puncture diameter; laterally with sparse to moderate, fine punctation, posterolaterally with dense coarse punctation; posterolateral corners raised as an angulate tooth. Scutellum subsquare, entire dorsal surface densely covered with

coarse subcircular punctation. Dorsellum with dense medium punctation, laterally ridged. Propodeum with areola same length or slightly longer than neighbouring areae. Mesepisternum with pit-like, shallow reticulations, reticulations approximately same size as those on anterior portion of lateral surface of pronotum, scrobe and mesepisternal groove absent. Mesosternum with anterior concavity nearly impunctate, shiny, posteriorly sparsely punctate, punctures fine and ill-defined; no mesosternal processes.

Forewing: Pterostigma 0.79 (0.37-0.79, mean 0.55) X length of anterior margin of marginal cell. Marginal cell 4.18 (3.33-4.18, mean 3.79) X as long as wide, 1.36 (1.36-1.57, mean 1.50) X length of second submarginal. Second submarginal cell sessile anteriorly, 0.47 (0.41-0.48, mean 0.45) X length of discoidal cell. Third submarginal cell with vein nebulous anteriorly, spectral posteriorly; medial vein spectral; accessory vein nebulous, slightly pigmented, 1.35 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur simple with greatest width at midlength; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.62 (0.62-0.84, mean 0.76) X length of longer spur, longer spur almost straight; basitarsus straight. Hind leg: Coxa entirely with moderate medium punctation, interspaces subequal to puncture diameter, mesal margin with longitudinal carina > 0.6 X length of coxa, ventral surface convex; trochanter simple; femur with setae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae only on posterior surface with several setae anteriorly, shorter than shorter spur, shorter spur 0.69 (0.69-0.82, mean 0.74) X length of longer spur, longer spur almost straight, 0.77 (0.77-0.83, mean 0.80) X length of basitarsus; basitarsus with dense microsetae, macrosetae only on posterior surface and shorter than those on tibia, ventral surface with three rows of short spines.

Metasoma 1.55 (1.30-1.55, mean 1.39) X as long as wide. First segment narrow and fairly long, 2.50 (2.32-2.50, mean 2.41) X as long as wide, 3.05 (2.80-3.05, mean 2.93) X as long as high, 1.03 (1.02-1.06, mean 1.04) X as long as T2; tergum, except tergulum, with dense coarse subcircular punctation, tergulum with moderate fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum with dense coarse punctation, median carina absent. T2 1.05 (0.99-1.05, mean 1.02) X as long as wide, 1.07 (1.02-1.07, mean 1.05) X as wide as mesosoma, vestiture subdecumbent to suberect, anterior one-third with moderate medium punctation, interspaces shiny and subequal to puncture diameter, posterior two-thirds with sparse fine punctation, interspaces shiny and wider than puncture diameter, felt line 0.44 (0.43-0.54, mean 0.47) X length of tergum, length anterior to felt line 1.37 (1.37-1.61, mean 1.49) X length of tergum posterior to felt line;

S2 convex, setae evenly distributed and shorter than shorter mesotibial spur, anteriorly with moderate medium punctation, interspaces shiny and subequal to puncture diameter, mesal area with very slight carina, < 0.5 X length of sternum, posteriorly with sparse to moderate and fine to medium punctation, punctures decreasing in density and size posteriorly, interspaces shiny and subequal to puncture diameter, felt line absent. Pygidium slightly transverse, posterior margin convex, anterior one-third sparsely punctate, interspaces smooth and wider than puncture diameter, pygidial plate entirely smooth, sometimes with very sparse fine punctation; hypopygium with posterior margin convex, mesal area possibly with longitudinal depression < 0.5 X length of sternum. Genitalia as in fig. 69.

FEMALE: Unknown.

MATERIAL EXAMINED

TYPE MATERIAL. Holotype: ♂, "[SAUDI] ARABIA / Lith [20°09'N 40°16'E] / 10 m. inland / i.1945 / Dr. B.P. Uvarov"; "Brit. Mus. / 1946-347" (NHML).

Measured paratypes: 4♂: SAUDI ARABIA: [1, 2, 3]Lith, 10 m inland, 20°09'N 40°16'E, i.1945 (Dr. B.P. Uvarov, Brit. Mus. 1946-347) (3♂, NHML); [4]Shagga al Yamaniya; 40 m S. of Lith, 19°42'N 40°48'E, 28.iii.1948 (B.P. Uvarov, B.M. 1948-265) (1♂, NHML).

Additional paratypes: 2♂: SAUDI ARABIA: Lith, 10 m inland, 20°09'N 40°16'E, i.1945 (Dr. B.P. Uvarov, Brit. Mus. 1946-347) (2♂, NHML).

DISTRIBUTION

This species occurs in southwestern Asia, with specimens recorded only from Saudi Arabia (fig. 86).

DISCUSSION

This species is most similar to *T. n. niloticus* from which it differs mainly in the shape of the free border of the clypeus, presence of a carina on the dorsal rim of the mandibles, sculpturing of the dorsellum and mesal margin of the metacoxa, presence of the felt line on S2, sculpturing on the mesal area of the hypopygium and shape of the genitalia (figs 69 & 70). In *T. indistinctus*, the free border of the clypeus is strongly convex with a very slight protuberances on either side of the midline, the dorsal rim of mandibles has a carina only on the proximal half, the mesal margin of the metacoxa has a longitudinal carina greater than 0.6 X length of the coxa and the mesal area of the hypopygium has a longitudinal depression smaller than 0.5 X length of the sternum. In *T. n. niloticus*, the free border of the clypeus is strongly convex, the dorsal rim of the mandibles has a carina along the entire length, and the mesal margin of the metacoxa and the mesal area of the hypopygium is simple. *Tricholabiodes indistinctus*

also bears some resemblance to *T. scorteccii* but can easily be separated by the shape of the posterior sides of the head, behind the compound eyes. In *T. indistinctus* the sides of the head behind the compound eyes are distinctly convergent posteriorly, while *T. scorteccii* has sides of the head behind the compound eyes only slightly convergent posteriorly.

ETYMOLOGY

"*indistinctus*" (L.), obscure; in reference to the nondescript nature of this species.

***Tricholabiodes scorteccii* Invrea, 1965. ♂**

Tricholabioides [*sic*] *scorteccii* Invrea, 1965:62. ♂

[*Tricholabioides* [*sic*]] *scorteccii* Invrea; Suárez, 1990:184, 187, fig. 33 ♂

DIAGNOSIS

MALE: Metasoma entirely medium yellowish-brown or dark reddish-black. Head with sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with scrobal carina absent. Free border of clypeus strongly convex. Middle and inner mandibular tooth separated by distance subequal to width of apical tooth, inner tooth acute. Dorsellum with dense medium, ill-defined punctation, laterally ridged. Mesepisternum with scrobe present, mesepisternal groove absent; no mesosternal processes. Mesal margin of metacoxa simple; basitarsus with macrosetae absent. Metasoma with anterior two-thirds of T2 strongly reticulated, giving the appearance of being costulated, or tergum entirely costulated except for posterior margin smooth; sternum with anterior mesal area with slight carina, < 0.5 X length of sternum, S2 without felt line. Pygidium with pygidial plate entirely smooth, except lateral and posterior margin finely punctured; hypopygium with mesal area with longitudinal depression > 0.5 X length of sternum. Genitalia as in fig. 64.

REDESCRIPTION

MALE: Length 8.40 (8.31-8.50, mean 8.41) mm. Head, including clypeus and antennae, pale to medium yellowish-brown; mandible almost entirely pale yellowish-brown, apex black, ventral tooth either pale yellowish-brown or pale reddish-brown; mesosoma medium yellowish-brown; legs, including coxae and tibial spurs, pale yellowish-brown; forewing lightly infuscated posterior to marginal cell; pterostigma and wing veins pale yellowish-brown; metasoma entirely medium yellowish-brown or dark reddish-

black; entire body covered with long, pallid setae.

Head 1.42 (1.40-1.44, mean 1.42) X as wide as long, 1.03 (1.00-1.05, mean 1.03) X as wide as mesosoma, 1.52 (1.51-1.53, mean 1.52) X as wide as vertex, 1.45 (1.45-1.47, mean 1.46) X as long as compound eye, sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with sparse fine punctation, interspaces shiny and wider than puncture diameter; foveola deep; surface between median ocellus and foveola smooth, without longitudinal median groove, between toruli longitudinal median groove subrounded in section and shallow; scrobal carina absent, scrobal tubercle small; antennal tubercle simple, with sparse fine punctation. Vertex 0.60 (0.58-0.65, mean 0.62) X as long as wide, 1.20 (1.18-1.39, mean 1.29) X as wide as frons; posterior to lateral ocellus with sparse fine punctation, interspaces shiny and wider than puncture diameter. Compound eye with ommatidia distinct. Ocelli large, convex and broadly oval, median ocellus 0.80 (0.79-0.80, mean 0.80) X as long as wide, interocellar distance 0.91 (0.90-0.95, mean 0.93) X ocellocular distance. Gena with sparse medium punctation, interspaces irregular. Clypeus 0.42 (0.40-0.43, mean 0.42) X as high as wide, free border strongly convex; central portion raised and slightly convex, with sparse fine punctation, interspaces 3 X puncture diameter; vestiture length longer than height of clypeus. Mandible higher than thick, dorsal rim with carina only on proximal half; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth separated by distance subequal to width of apical tooth, inner tooth acute; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 0.81 (0.78-0.83, mean 0.81) X height at base. Antenna with scape 2.00 (1.96-2.05, mean 2.01) X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere simple; second flagellomere 1.32 (1.30-1.42, mean 1.36) X length of first, 1.00 (0.99-1.02, mean 1.01) X length of third.

Mesosoma, excluding anterior collar, 1.72 (1.70-1.76, mean 1.73) X as long as wide. Pronotum 0.90 (0.90-0.93, mean 0.92) X as wide as mesosoma, anterodorsal surface with dense ill-defined punctation mesally, becoming pit-like shallow reticulations laterally, strongly convex, humeral angle subsquare; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct and almost as large as a reticulation; posterior portion of lateral surface with sparse fine punctation, interspaces irregular and wider than puncture diameter, posterior margin impunctate. Mesoscutum 0.74 (0.74-0.75, mean 0.75) X as long as wide, 0.85 (0.83-0.85, mean 0.85) X as wide as pronotum; between notauli with moderate medium punctation, interspaces smooth and subequal to puncture diameter; laterally with sparse, fine to medium punctation, posterolaterally with dense coarse punctation; posterolateral corner

raised as an angulate tooth. Scutellum subsquare, entire dorsal surface densely covered with coarse subcircular punctations. Dorsellum with dense medium ill-defined punctation, laterally ridged. Propodeum with areola same length as neighbouring areae. Mesepisternum with pit-like, shallow reticulations, anterior to scrobe reticulations smaller than those on anterior portion of lateral surface of pronotum, posterior to scrobe reticulations approximately same size as those on anterior portion of lateral surface of pronotum, scrobe an indistinct subcircular depression, mesepisternal groove absent. Mesosternum with anterior concavity nearly impunctate, shiny, posteriorly with sparse to moderate punctation, punctures medium and ill-defined; no mesosternal processes.

Forewing: Pterostigma 0.49 (0.43-0.55, mean 0.49) X length of anterior margin of marginal cell. Marginal cell 4.50 (4.47-4.95, mean 4.71) X as long as wide, 1.45 (1.42-1.46, mean 1.44) X length of second submarginal. Second submarginal cell sessile anteriorly, 0.50 (0.49-0.54, mean 0.52) X length of discoidal cell. Third submarginal cell with vein 3r-m tubular anterior to junction with accessory vein, spectral posterior to junction with accessory vein; medial vein spectral; accessory vein nebulous, 1.20 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur simple with greatest width at midlength; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.74 (0.73-0.75, mean 0.74) X length of longer spur, longer spur almost straight; basitarsus straight. Hind leg: Coxa entirely with sparse punctation, interspaces wider than puncture diameter, mesal margin simple, ventral surface convex; trochanter simple; femur with macrosetae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae sparsely but evenly distributed, shorter than shorter spur, shorter spur 0.68 (0.68-0.69, mean 0.69) X length of longer spur, longer spur almost straight, 0.81 (0.80-0.86, mean 0.83) X length of basitarsus; basitarsus with dense microsetae, macrosetae absent, ventral surface with three rows of short spines.

Metasoma 1.31 (1.30-1.39, mean 1.35) X as long as wide. First segment narrow and fairly long, slightly constricted at apex, 2.55 (2.55-2.65, mean 2.60) X as long as wide, 2.70 (2.70-2.79, mean 2.75) X as long as high, 1.03 (1.00-1.05, mean 1.03) X as long as T2; tergum, except tergulum, with pit-like, shallow reticulations, reticulations approximately same size as those on mesepisternum, tergulum smooth and shiny; sternum with dense coarse punctation, mesal area without distinct carina. T2 1.06 (1.00-1.08, mean 1.04) X as long as wide, 1.04 (1.01-1.06, mean 1.04) X as wide as mesosoma, vestiture subdecumbent to suberect, anterior two-thirds strongly reticulated, giving the appearance of being costulated, or tergum entirely costulated except for posterior margin smooth, with sparse fine punctation

between costae, felt line 0.45 (0.41- 0.49, mean 0.45) X length of tergum, length anterior to felt line 1.22 (1.20-1.29, mean 1.25) X length of tergum posterior to felt line: S2 convex, setae evenly distributed and shorter than shorter mesotibial spur, anteriorly with dense coarse punctation, interspaces irregular and narrower than puncture diameter, mesal area with slight carina, < 0.5 X length of sternum, posteriorly with sparse to moderate, fine punctation, punctures decreasing in size posteriorly, interspaces shiny and wider than puncture diameter, felt line absent. Pygidium transverse, posterior margin strongly convex, anterior one-third irregular and moderately punctate, interspaces subequal to puncture diameter, pygidial plate entirely smooth, except lateral and posterior margin finely punctured; hypopygium with posterior margin convex, mesal area with longitudinal depression < 0.5 X length of sternum but sometimes indistinct. Genitalia as in fig. 64.

FEMALE: Unknown.

MATERIAL EXAMINED

TYPE MATERIAL. Holotype: ♂, "[YEMEN:] Arabia merid. / Hadhramaut [15°00'N 50°00'E] / leg. G. Scortecci"; "Madi / m. 500 / 31.III.1962"; "TYPUS"; *Tricholabioides* [*sic*] / *scorteccii* / Typus n.sp. / Determ.[ine] F. Invrea." (MCSN).

Measured paratype: 2♂: YEMEN: [1]Hadhramaut, Goraf, 6.iv.1962 (G. Scortecci) *det.* by Invrea as *Tricholabiodes scorteccii* n.sp. (1♂, MCSN); Hadhramaut, Ingeramis a sud dell'altipiano, 15°00'N 50°00'E, 30.iv.1962 (G. Scortecci) *det.* by Invrea as *Tricholabiodes scorteccii* Invr. (1♂, MNCN).

MEASURED MATERIAL. 1♂: YEMEN: Jebel Harir, 5200 ft., 13°44'N 44°55'E, 26.x-6.xi.1937 (H. Scott & E. B. Britton, B.M. Exp. to S.W. Arabia, B.M. 1938-246) (1♂, NHML).

DISTRIBUTION

Tricholabiodes scorteccii occurs in southwestern Asia, with specimens recorded from Yemen (fig. 86).

DISCUSSION

Invrea (1965) described this species from several specimens, collected by G. Scortecci. Suárez (1990) never redescribed this species but only included it in a key to some of the Palaearctic species and a catalogue of virtually all described species of *Tricholabiodes*. The type material studied agrees with Invrea's (1965) description exactly while the genitalia match the drawing provided by Suárez (1990).

The additional specimens, which this redescription is partly based upon, differ from the type material

in colour and sculpturing on T2. The type material is darker and has only the anterior two-thirds of T2 reticulate, while the additional specimen, "... Jezel Harir ..." has T2 entirely reticulate. All other characters, including the genitalia, are virtually identical.

This species is most similar to *T. indistinctus* but can easily be separated by the shape of the posterior sides of the head behind the compound eyes. In *T. scorteccii*, the sides of the head behind the compound eyes are only slightly convergent posteriorly, while in *T. indistinctus* the sides of the head behind the compound eyes are distinctly convergent posteriorly.

***Tricholabiodes luridus* sp. nov. ♂**

DIAGNOSIS

MALE: Body and appendages, except for darker mandibular apices and pale yellowish-brown ventral tooth, entirely golden yellow to pale yellowish-brown, sometimes metasoma dark yellowish-brown Head with sides behind compound eyes strongly convergent posteriorly and gradually merging with weakly convex posterior margin. Free border of clypeus strongly convex. Middle and inner mandibular teeth separated by distance subequal to width of apical tooth, inner tooth subrounded. Dorsellum with dense fine punctation, laterally ridged. Mesepisternum with scrobe and mesepisternal groove present; no mesosternal processes. Mesobasitarsus curved strongly ventrally. Mesal margin of mesocoxa with longitudinal carina > 0.6 X length of coxa; basitarsus with macrosetae only on posterior margin. Metasoma with anterior one-third of T2 with moderate coarse punctation, interspaces shiny and subequal to puncture diameter; mesal area of S2 with slight carina, < 0.5 X length of sternum, S2 without felt line. Pygidium with pygidial plate entirely with dense fine punctation, except anterolateral margin smooth; hypopygium with mesal area with longitudinal depression > 0.5 X length of sternum. Genitalia as in fig. 65.

DESCRIPTION

MALE: Length 7.82 (7.71-9.03, mean 8.08) mm. Body and appendages, except for darker mandibular apices and pale yellowish-brown ventral tooth, entirely golden yellow to pale yellowish-brown, sometimes metasoma dark yellowish-brown; forewing lightly infuscated posterior to pterostigma; entire body covered with long, pallid setae.

Head 1.51 (1.45-1.57, mean 1.52) X as wide as long, 0.99 (0.98-1.06, mean 1.01) X as wide as

mesosoma, 1.65 (1.36-1.66, mean 1.58) X as wide as vertex, 1.30 (1.23-1.39, mean 1.30) X as long as compound eye, sides behind compound eyes strongly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with sparse fine punctation, interspaces shiny and wider than puncture diameter; foveola deep; surface between median ocellus and foveola without longitudinal median groove though slightly longitudinally depressed, between toruli longitudinal median groove subrounded in section and shallow; scrobal carina slight, arcuate, not reaching scrobal tubercle; antennal tubercle simple, with sparse fine punctation. Vertex 0.71 (0.63-0.74, mean 0.65) X as long as wide, 1.32 (1.32-1.53, mean 1.38) X as wide as frons; posterior to lateral ocellus with sparse fine punctation, interspaces shiny and wider than puncture diameter. Compound eye with ommatidia distinct. Ocelli large, convex and broadly oval, median ocellus 0.77 (0.77-0.86, mean 0.83) X as long as wide, interocellar distance 1.13 (1.13-1.24, mean 1.19) X ocellocular distance. Gena with sparse, fine to medium punctation, interspaces shiny. Clypeus 0.43 (0.40-0.43, mean 0.42) X as high as wide, free border strongly convex; central portion raised and slightly convex, with sparse fine punctation, interspaces 3 X puncture diameter; vestiture length longer than height of clypeus. Mandible higher than thick, dorsal rim with carina along entire length, ending before base of inner tooth; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth separated by distance subequal to width of apical tooth, inner tooth subrounded; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 0.87 (0.82-0.90, mean 0.86) X height at base. Antenna with scape 2.05 (2.00-2.22, mean 2.07) X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere simple; second flagellomere 1.46 (1.37-1.55, mean 1.46) X length of first, 0.93 (0.93-1.07, mean 1.02) X length of third.

Mesosoma, excluding anterior collar, 1.82 (1.57-1.82, mean 1.73) X as long as wide. Pronotum 0.85 (0.85-0.93, mean 0.90) X as wide as mesosoma, anterodorsal surface mesally with dense ill-defined punctation becoming pit-like shallow reticulations laterally, strongly convex, humeral angle subrounded; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct and almost as large as a reticulation; posterior portion of lateral surface with sparse fine punctation, interspaces irregular and wider than puncture diameter, posterior margin impunctate. Mesoscutum 0.76 (0.76-0.84, mean 0.81) X as long as wide, 0.85 (0.79-0.85, mean 0.83) X as wide as pronotum; between notauli with sparse to moderate, fine to medium punctation, interspaces smooth and subequal to puncture diameter; laterally with sparse fine punctation, posterolaterally with dense coarse punctation; posterolateral corner raised as an angulate tooth. Scutellum subsquare, entire dorsal surface moderately to densely covered with medium to coarse punctation. Dorsellum with dense fine punctation, laterally

ridged. Propodeum with areola same length as neighbouring areae. Mesepisternum, anterior to scrobe roughly striated becoming shallow pit-like reticulations posteriorly, posterior to scrobe with pit-like, shallow reticulations, reticulations approximately same size as those on anterior portion of lateral surface of pronotum, scrobe an indistinct subcircular depression, mesepisternal groove absent. Mesosternum with anterior concavity transversely ridged, posteriorly smooth to sparsely punctate; no mesosternal processes.

Forewing: Pterostigma small, 0.46 (0.45-0.71, mean 0.55) X length of anterior margin of marginal cell. Marginal cell 4.05 (3.34-4.18, mean 3.83) X as long as wide, 1.65 (1.41-1.65, mean 1.57) X length of second submarginal. Second submarginal cell sessile anteriorly, 0.44 (0.41-0.48, mean 0.44) X length of discoidal cell. Third submarginal cell with vein 3r-m tubular anterior to junction with accessory vein, nebulous becoming spectral posterior to junction with accessory vein; medial vein spectral; accessory vein nebulous, 1.15 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur simple with greatest width at midlength; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.77 (0.74-0.91, mean 0.80) X length of longer spur, longer spur almost straight; basitarsus curved strongly ventrally. Hind leg: Coxa entirely with sparse to moderate, medium punctation, interspaces subequal to puncture diameter, mesal margin sometimes with slight longitudinal carina > 0.6 X length of coxa, ventral surface convex; trochanter simple; femur with macrosetae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae sparsely but evenly distributed, shorter than shorter spur, shorter spur 0.62 (0.62-0.75, mean 0.71) X length of longer spur, longer spur almost straight, 0.85 (0.63-0.85, mean 0.75) X length of basitarsus; basitarsus with dense microsetae, macrosetae only on posterior margin and shorter than those on tibia; ventral surface with three, sometime indistinct, rows of short spines.

Metasoma 1.42 (1.16-1.42, mean 1.32) X as long as wide. First segment moderately narrow and fairly long, slightly constricted at apex, 2.30 (2.20-2.53, mean 2.35) X as long as wide, 2.65 (2.60-2.82, mean 2.65) X as long as high, 1.00 (0.87-1.13, mean 1.00) X as long as T2; tergum, except tergulum, with dense coarse subcircular punctation, tergulum with moderate fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum with dense coarse punctation, median carina continuous. T2 0.94 (0.90-1.02, mean 0.94) X as long as wide, 0.99 (0.99-1.06, mean 1.03) X as wide as mesosoma, vestiture subdecumbent to suberect, anterior one-third with moderate, medium to coarse punctation, interspaces shiny and subequal to puncture diameter, posterior two-thirds shallowly and sparsely punctate, interspaces shiny and 3-4 X wider than puncture

diameter, felt line 0.51 (0.43-0.53, mean 0.48) X length of tergum, length anterior to felt line 1.58 (1.17-1.58, mean 1.33) X length of tergum posterior to felt line; S2 convex, setae evenly distributed and shorter than shorter mesotibial spur, anteriorly with moderate medium punctation, interspaces irregular and subequal to puncture diameter, mesal area with very slight short carina, < 0.25 X length of sternum, posteriorly with sparse fine punctation, interspaces shiny and wider than puncture diameter, felt line absent. Pygidium with posterior margin convex, anterior one-third with sparse to moderate, fine punctation, interspaces wider than puncture diameter, pygidial plate entirely with dense fine punctation; hypopygium with posterior margin convex, mesal area with slight longitudinal depression > 0.5 X length of sternum. Genitalia as in fig. 65.

FEMALE: Unknown.

MATERIAL EXAMINED

TYPE MATERIAL. Holotype: ♂, "Nakhali Dubai [25°15'08"N 55°16'48"E] / United Arab Emirates / ix.1984 / E.A. Sugden"; "light trap" (NHML).

Measured paratypes: 3♂: UNITED ARAB EMIRATES: [1, 2]Bidayar al Ashkhar, dunes, 24°56'N 55°43'E, 20.iv.1984 (E.A. Sugden) light trap (2♂, UCDC). OMAN: [3]Northern region, Wahiba Sands, 340m, 22°18'N 58°52'E (M.D. Gallagher & B. Skule, MDG 8545) (1♂, DJBC).

Additional paratypes: 3♂: UNITED ARAB EMIRATES: Nakhali, 25°15'08"N 55°16'48"E, ix.1984 (E.A. Sugden) light trap (1♂, UCDC); Bidayar al Ashkhar, dunes, 24°56'N 55°43'E, 20.iv.1984 (E.A. Sugden) light trap (2♂, UCDC).

DISTRIBUTION

This species occurs in southwestern Asia, with specimens recorded from the United Arab Emirates and Oman (fig. 87).

DISCUSSION

This species is most similar to *T. scorteccii* but can be separated by the sculpturing on the mesal margin of the metacoxa. In *T. luridus*, the mesal margin of the metacoxa has a longitudinal carina, while in *T. scorteccii* the mesal margin is simple. Although *T. luridus* and *T. garamantis* are also very similar, particularly in coloration, they can easily be separated by the posterior shape of the head behind the compound eyes. *Tricholabiodes luridus* has the sides of the head behind the compound eyes strongly convergent posteriorly, unlike *T. garamantis*, which has the sides of the head behind the compound eyes slightly convergent posteriorly.

ETYMOLOGY

"*luridus*" (L.), pale-yellow; in reference to colour of the entire animal.

Tricholabiodes parallelus **sp. nov.** ♂

DIAGNOSIS

MALE: Metasoma with T1 entirely medium yellowish-brown, T2-T6 dark reddish-brown, sterna paler than corresponding terga. Head with sides behind compound eyes subparallel, distinct from weakly convex posterior margin. Free border of clypeus strongly convex with a rounded tubercle on each side of midline. Middle and inner mandibular teeth separated by distance subequal to width of apical tooth, inner tooth truncate. Mesosoma with dorsellum laterally ridged; mesepisternum with scrobe present, mesepisternal groove absent; no mesosternal processes. Posteriorly on basal half of mesofemur with slight elongate protuberance. Mesal margin of metacoxa with short, thinly sclerotised, triangular protuberance 0.25 X length of coxa. Metasoma with 1st segment short. Anterior one-third of T2 with moderate medium punctation, interspaces irregular; anterior mesal area of S2 with slight carina < 0.5 X length of sternum, S2 without felt line. Pygidium with pygidial plate anteriorly smooth although surface slightly irregular, posteriorly with dense fine punctation; mesal area of hypopygium with longitudinal depression > 0.5 X length of sternum. Genitalia as in fig. 44.

DESCRIPTION

MALE: Length 10.88 (10.68-13.05, mean 11.35) mm. Head, including clypeus and antenna, medium yellowish-brown; mandible, including ventral tooth, almost entirely pale yellowish-brown, apex black; mesosoma medium yellowish-brown; legs, including coxae and tibial spurs, pale yellowish-brown; forewing lightly infuscated posterior to marginal cell; pterostigma pale yellowish-brown; wing veins golden yellow; metasoma with T1 entirely medium yellowish-brown, T2-T6 dark reddish-brown, sterna paler than corresponding terga; entire body covered with long, pallid setae.

Head 1.41 (1.29-1.42, mean 1.38) X as wide as long, 1.02 (0.97-1.06, mean 1.01) X as wide as mesosoma, 1.55 (1.51-1.57, mean 1.54) X as wide as vertex, 1.46 (1.46-1.62, mean 1.52) X as long as compound eye, sides behind compound eyes subparallel, distinct from weakly convex posterior margin. Frons with sparse fine punctation, interspaces shiny and wider than puncture diameter; foveola deep; surface between median ocellus and foveola with longitudinal median groove, sides subparallel, between toruli longitudinal median groove subrounded in section and shallow; scrobal carina weak, short, not

reaching scrobal tubercle; antennal tubercle simple, with sparse fine punctation. Vertex 0.72 (0.69-0.74, mean 0.72) X as long as wide, 1.40 (1.37-1.44, mean 1.40) X as wide as frons; posterior to lateral ocellus with sparse fine punctation, interspaces shiny and wider than puncture diameter. Compound eye with ommatidia distinct. Ocelli large, convex and broadly oval, median ocellus 0.90 (0.81-0.92, mean 0.86) X as long as wide, interocellar distance 1.29 (1.10-1.44, mean 1.26) X ocellocular distance. Gena with sparse medium punctation, interspaces shiny. Clypeus 0.37 (0.36-0.37, mean 0.37) X as high as wide, free border strongly convex with a rounded tubercle on each side of midline; central portion raised and slightly convex, with sparse fine punctation, interspaces 3 X puncture diameter; vestiture length longer than height of clypeus. Mandible higher than thick, dorsal rim with carina along entire length, ending at base of inner tooth; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth separated by distance subequal to width of apical tooth, inner tooth truncate; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 0.82 (0.82-0.91, mean 0.86) X height at base. Antenna with scape 2.15 (1.74-2.15, mean 1.91) X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere simple; second flagellomere 1.46 (1.20-1.46, mean 1.33) X length of first, 1.00 (0.98-1.06, mean 1.01) X length of third.

Mesosoma, excluding anterior collar, 1.62 (1.61-1.69, mean 1.65) X as long as wide. Pronotum 0.91 (0.91-0.96, mean 0.93) X as wide as mesosoma, anterodorsal surface with sparse fine punctation mesally, becoming pit-like shallow reticulations laterally, strongly convex, humeral angle subsquare; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct and almost as large as a reticulation; posterior portion of lateral surface with sparse fine punctation, interspaces irregular and wider than puncture diameter, posterior margin impunctate. Mesoscutum 0.73 (0.73-0.82, mean 0.76) X as long as wide, 0.85 (0.79-0.83, mean 0.83) X as wide as pronotum; between notauli with moderate medium punctation, interspaces smooth and subequal to puncture diameter; laterally with sparse to moderate and fine to medium punctation, posterolaterally with dense medium punctation; posterolateral corner raised as an angulate tooth. Scutellum subsquare, entire dorsal surface densely covered coarse ill-defined punctation. Dorsellum with dense moderate ill-defined punctation, laterally ridged. Propodeum with areola same length as neighbouring areae. Mesepisternum, anterior to scrobe with sparse fine punctation becoming shallow pit-like reticulations posteriorly, posterior to scrobe with pit-like, shallow reticulations, reticulations approximately same size as those on anterior portion of lateral surface of pronotum, scrobe a distinct subcircular depression, mesepisternal groove absent. Mesosternum with anterior concavity nearly impunctate, shiny, posteriorly with sparse fine punctation; no mesosternal processes.

Forewing: Pterostigma 0.36 (0.36-0.47, mean 0.43) X length of anterior margin of marginal cell. Marginal cell 4.44 (4.12-4.73, mean 4.43) X as long as wide, 1.33 (1.37-1.74, mean 1.51) X length of second submarginal. Second submarginal cell sessile anteriorly, 0.68 (0.45-0.68, mean 0.53) X length of discoidal cell. Third submarginal cell with vein 3r-m tubular anterior to junction with accessory vein, nebulous becoming spectral posterior to junction with accessory vein; medial vein spectral; accessory vein nebulous, 1.00 X as long as marginal cell.

Legs. Mid leg: Coxa unarmed; femur with greatest width at midlength, posteriorly on basal half with slight elongate protuberance; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.71 (0.70-0.73, mean 0.71) X length of longer spur, longer spur almost straight; basitarsus straight. Hind leg: Coxa entirely with sparse punctation, interspaces wider than puncture diameter, mesal margin with short, thinly sclerotised triangular protuberance 0.25 X length of coxa, protuberance separate from contour of ventral surface of coxa, ventral surface convex; trochanter simple; femur with macrosetae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae sparsely but evenly distributed, shorter than shorter spur, shorter spur 0.63 (0.57-0.63, mean 0.60) X length of longer spur, longer spur almost straight, 0.81 (0.78-0.92, mean 0.83) X length of basitarsus; basitarsus with dense microsetae, macrosetae only on posterior margin and shorter than those on tibia.

Metasoma 1.41 (1.11-1.41, mean 1.30) X as long as wide. First segment narrow and short, slightly constricted at apex, 2.30 (2.30-2.42, mean 2.35) X as long as wide, 2.74 (2.65-2.77, mean 2.72) X as long as high, 1.17 (0.98-1.17, mean 1.05) X as long as T2; tergum, except tergulum, with dense coarse punctation, tergulum with moderate fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum with dense coarse punctation, median area without distinct carina. T2 0.86 (0.86-1.00, mean 0.94) X as long as wide, 1.03 (1.02-1.12, mean 1.05) X as wide as mesosoma, vestiture subdecumbent to suberect, anterior one-third with moderate medium punctation, interspaces irregular, posterior two-thirds with sparse to moderate, fine punctation, interspaces shiny and subequal to puncture diameter, felt line 0.53 (0.44-0.54, mean 0.50) X length of tergum, length anterior to felt line 1.65 (1.12-1.65, mean 1.45) X length of tergum posterior to felt line; S2 convex, setae evenly distributed and shorter than shorter mesotibial spur, entirely with moderate medium punctation, posteriorly punctures decrease in density and size, interspaces shiny and subequal to puncture diameter, mesal area with slight carina < 0.5 X length of sternum, felt line absent. Pygidium transverse, margin defined by slightly elevated ridge, posterior margin subsquare, anterior one-third irregular and moderately punctate, interspaces subequal to puncture diameter, pygidial plate anterior one-third smooth although surface slightly irregular, posterior two-thirds with dense fine punctation;

hypopygium with posterior margin convex, mesal area with longitudinal depression more than 0.5 X length of sternum. Genitalia as in fig. 44.

FEMALE: Unknown.

MATERIAL EXAMINED

TYPE MATERIAL. Holotype: ♂, "KENYA / Kora National Res.[erve] / Base Camp [0°06'S 38°45'E] / light trap / 28.vii.1983 / Ritchie, Collins / & Muhangani" (NMKE).

Measured paratypes: 3♂: same data (3♂, NMKE).

DISTRIBUTION

This species occurs in East Africa, along the east coast, with specimens recorded only from Kenya (fig. 87).

DISCUSSION

This species is very similar to *T. pedunculatoides*, and using Suárez's (1990) key, keys out as *T. pedunculatoides*. *Tricholabiodes parallelus* can easily be separated and identified from *T. pedunculatoides* by the shape of the free border of the clypeus and the mesal margin of the metacoxa. In *T. parallelus*, the free border of the clypeus is convex with a rounded tubercle on each side of the midline, while the metacoxa has the mesal margin with a thinly sclerotised triangular protuberance 0.25 X length of the coxa. In *T. pedunculatoides*, the free border of the clypeus is convex with a longitudinally elongate tubercle on each side of the midline, while the mesal margin of the metacoxa has a blunt triangular protuberance 0.25-0.50 X length of the coxa. Although, *T. parallelus* is also very similar to *T. sinuatus*, these two species can be readily identified and separated by the shape of the metatrochanter. In *T. sinuatus*, the metatrochanter is ventrally swollen (appearing bulbous), while in *T. parallelus*, the metatrochanter is small.

ETYMOLOGY

"*parallelus*" (L.), side by side; in reference to the shape of the head, particularly the sides behind the compound eyes.

***Tricholabiodes pedunculatoides* Bischoff, 1920. ♂**

Mutilla (*Tricholaboides* [*sic*]) *pedunculata* Klug; André, 1896b:284 (misidentification).♂

M. [*utilla*] *pedunculata* Klug; Magretti, 1898:42 (misidentification). ♂

M. [*utilla*] (*Tricholabioides* [*sic*]) *pedunculata* Klug; Magretti, 1899:599 (misidentification). ♂

[*Tricholabioides* [*sic*] *semistriata* [*sic*] (Klug)] subsp. *pedunculatoides* Bischoff, 1920:105. ♂

Tricholabioides [*sic*] *semistriata* [*sic*] (Kl.[ug]); Invrea, 1952:45 (misidentification). ♂

Tricholabioides [*sic*] *semistriata* [*sic*] (Kl.[ug]); Invrea, 1962:326 (misidentification). ♂

[*Tricholabioides* [*sic*] *semistriata* [*sic*]] *pedunculatoides* [Bischoff]; Invrea, 1965:61. ♂

Tricholabioides [*sic*] *pedunculatoides* Bischoff; Suárez, 1990:161, 182, 187, figs 2(f), 3(I), 4(c), 5(I), 6(d), 21, 24. ♂

DIAGNOSIS

MALE: Metasoma with T1 entirely medium yellowish-brown, T2-T6 pale to dark reddish-brown, becoming dark yellowish-brown posteriorly, sterna paler than corresponding terga. Head with sides behind compound eyes subparallel, distinct from weakly convex posterior margin. Free border of clypeus strongly convex with a longitudinal elongate tubercle on each side of midline. Middle and inner mandibular teeth separated by distance subequal to width of apical tooth, inner tooth truncate. Mesosoma with mesepisternal groove absent; no mesosternal processes. Posteriorly on basal half of mesofemur with a slight elongate protuberance, at midlength shallowly concave. Mesal margin of metacoxa with blunt triangular protuberance 0.25-0.50 X length of coxa; trochanter slightly swollen ventrally. Anterior one-third of T2 with longitudinal rectangular reticulations or entirely costulate, with sparse fine punctation within each reticulation or between costae; anterior mesal area of S2 with slight carina < 0.5 X length of sternum; S2 without felt line. Pygidium with pygidial plate anteriorly smooth although surface slightly irregular, posteriorly with dense fine punctation; hypopygium with longitudinal mesal depression < 0.5 X length of sternum. Genitalia as in fig. 43

REDESCRIPTION

MALE: Length 14.53 (6.32-15.90, mean 13.69) mm. Head, including clypeus and antenna, medium yellowish-brown, antenna often paler than head but never golden yellow; mandible, including ventral tooth, almost entirely pale yellowish-brown, apex black; mesosoma medium yellowish-brown; legs, including coxae and tibial spurs, pale yellowish-brown; forewing lightly infuscated posterior to pterostigma; pterostigma and wing veins pale yellowish-brown; metasoma with T1 entirely medium yellowish-brown, T2-T6 pale to dark reddish-brown, becoming dark yellowish-brown posteriorly, sterna paler than corresponding terga; entire body covered with long, pallid setae.

Head 1.39 (1.36-1.44, mean 1.40) X as wide as long, 0.92 (0.90-1.06, mean 0.94) X as wide as mesosoma, 1.47 (1.30-1.58, mean 1.55) X as wide as vertex, 1.50 (1.50-1.59, mean 1.55) X as long as compound eye, sides behind compound eyes subparallel, distinct from weakly convex posterior margin. Frons with sparse fine punctation, interspaces shiny and wider than puncture diameter; foveola deep; surface between median ocellus and foveola without longitudinal median groove though slightly longitudinally depressed but sometimes indistinct, between toruli longitudinal median groove subrounded in section and shallow; scrobal carina arcuate, not reaching scrobal tubercle but sometimes indistinct; antennal tubercle simple, with sparse fine punctation. Vertex 0.68 (0.63-0.81, mean 0.73) X as long as wide, 1.42 (1.34-1.42, mean 1.37) X as wide as frons; posterior to lateral ocellus with sparse fine punctation, interspaces shiny and wider than puncture diameter. Compound eye with ommatidia distinct. Ocelli large, convex and broadly oval, median ocellus 0.86 (0.75-0.91, mean 0.83) X as long as wide, interocellar distance 1.31 (1.18-1.48, mean 1.33) X ocellocular distance. Gena with sparse medium punctation with interspaces irregular. Clypeus 0.41 (0.35-0.41, mean 0.38) X as high as wide, free border strongly convex with a longitudinally elongate tubercle on each side of midline; central portion raised and slightly convex, mesal area between tubercles slightly longitudinally depressed, sparsely and finely punctate, interspaces 2 X puncture diameter; vestiture length longer than height of clypeus. Mandible higher than thick, dorsal rim with carina only on proximal half; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth separated by distance subequal to width of apical tooth, inner tooth truncate; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 0.82 (0.82-0.98, mean 0.89) X height at base. Antenna with scape 1.85 (1.85-2.16, mean 2.01) X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere simple; second flagellomere, 1.32 (1.30-1.50, mean 1.40) X length of first, 1.08 (1.00-1.08, mean 1.05) X length of third.

Mesosoma, excluding anterior collar, 1.61 (1.47-1.65, mean 1.56) X as long as wide. Pronotum 0.91 (0.85-0.91, mean 0.88) X as wide as mesosoma, anterodorsal surface with dense medium punctation mesally increasing in density laterally, strongly convex, humeral angle subsquare; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct and almost as large as a reticulation; posterior portion of lateral surface rough striated with sparse fine punctation, interspaces wider than puncture diameter, posterior margin impunctate. Mesoscutum 0.77 (0.70-0.82, mean 0.77) X as long as wide, 0.80 (0.79-0.89, mean 0.82) X as wide as pronotum; entirely with moderate medium punctation, interspaces irregular and subequal to puncture diameter, posterolaterally with dense coarse punctation; posterolateral corner raised as an angulate tooth. Scutellum subsquare, entire dorsal surface

densely covered with pit-like reticulations. Dorsellum laterally ridged with median longitudinal keel, impunctate, if median keel absent, entirely densely and coarsely punctate. Propodeum with areola longer than neighbouring areae. Mesepisternum with pit-like, shallow reticulations, reticulations approximately same size as those on anterior portion of lateral surface of pronotum, scrobe a distinct subcircular depression, mesepisternal groove absent. Mesosternum with anterior concavity nearly impunctate, shiny, posteriorly becoming moderately to densely punctate, punctures medium and ill-defined; no mesosternal processes.

Forewing: Pterostigma 0.47 (0.35-0.47, mean 0.42) X length of anterior margin of marginal cell. Marginal cell 4.42 (3.59-4.88, mean 4.50) X as long as wide, 1.57 (1.41-1.72, mean 1.57) X length of second submarginal. Second submarginal cell sessile anteriorly, 0.48 (0.41-0.51, mean 0.50) X length of discoidal cell. Third submarginal cell with vein 3r-m tubular anterior to junction with accessory vein, tubular, nebulous becoming absent posterior to junction with accessory vein; medial vein absent; accessory vein nebulous, 1.1 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur with greatest width at midlength, posteriorly on basal half with a slight elongate protuberance, at midlength shallowly concave; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.70 (0.61-0.84, mean 0.68) X length of longer spur, longer spur almost straight; basitarsus straight. Hind leg: Coxa entirely with moderate medium punctation, interspaces subequal to puncture diameter, mesal margin with blunt triangular protuberance 0.25-0.50 X length of coxa, ventral surface convex; trochanter slightly swollen ventrally; femur with macrosetae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae sparsely but evenly distributed, shorter than shorter spur, shorter spur 0.51 (0.51-0.61, mean 0.56) X length of longer spur, longer spur almost straight, 0.81 (0.74-0.84, mean 0.83) X length of basitarsus; basitarsus with dense microsetae, macrosetae only on posterior margin and shorter than those on tibia, ventral surface with a row of short stout spines.

Metasoma 1.39 (1.23-1.39, mean 1.28) X as long as wide. First segment moderately narrow and fairly long, slightly constricted at apex, 2.43 (2.05-2.62, mean 2.30) X as long as wide, 2.95 (2.59-2.95, mean 2.75) X as long as high, 1.04 (0.98-1.08, mean 1.03) X as long as T2; tergum, except tergulum, with dense coarse subcircular punctations, tergulum with moderate fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum with dense coarse punctation becoming sparser posteriorly, median carina continuous and irregular. T2 0.98 (0.86-1.05, mean 0.91) X as long as wide, 1.02 (0.95-1.08, mean 1.03) X as wide as mesosoma, vestiture sparse,

anterior one-third with either longitudinal rectangular reticulations or entirely costulate, with sparse fine punctation within each reticulation or between costae, posterior two-thirds with moderate to dense, medium punctation, interspaces shiny, felt line 0.50 (0.44-0.53, mean 0.48) X length of tergum, length anterior to felt line 1.21 (0.82-1.86, mean 1.38) X length of tergum posterior to felt line; S2 convex, setae evenly distributed and shorter than shorter mesotibial spur, anteriorly with moderate coarse punctation, interspaces irregular and subequal to puncture diameter, mesal area with slight carina < 0.5 X length of sternum, posteriorly with moderate medium punctation, interspaces shiny and subequal to puncture diameter, felt line absent. Pygidium transverse, posterior margin strongly convex, anterior one-third irregular with moderate to dense punctation, pygidial plate anteriorly smooth although surface slightly irregular, posteriorly with dense fine punctation; hypopygium with posterior margin convex, mesal area with longitudinal depression < 0.5 X length of sternum. Genitalia as in fig. 43.

FEMALE: Unknown.

MATERIAL EXAMINED

TYPE MATERIAL. Holotype: ♂, "Somali / Damaso [= Damassa; 3°09'N 41°20'E]/ 13.05.[19]01/ B.v. Erlanger"; "Type"; "*peduncula / toides* Bisch / det. Bischoff"; "*semistriata* [*sic*] / *pedunculatoides*" (ZMHB).

Measured paratypes: 5♂: SOMALIA: [4]S. Galla, Darassum, 8.iv.1901 (B.v. Erlanger) Paratype, *det.* by Bischoff as *pedunculatoides* Bisch. Paratype, *det.* as *semi. pedunculatoides* (1♂, ZMHB); [5]S. Galla, Biaderra, 6°09'N 48°38'E, 28.iv.1901 (B.v. Erlanger) Paratype, *det.* by Bischoff as *pedunculatoides* Bisch; [3]Lugh, 3°48'N 42°33'E, xi-xii.1895 (V. Bottego) *det.* as *semi. pedunculatoides*, *det.* as *pedunculatoides* Bisch. Paratype (1♂, ZMHB); [2]Damassa, 3°09'N 41°20'E, 15.v.1901 (B.v. Erlanger) Paratype, *det.* by Dr. Enderlein as *Mutilla pedunculata* Klug; *det.* by Bischoff as *pedunculatoides* Bisch.; *det.* by B. Petersen as *Tricholabiodes pedunculatoides* Bisch. (1♂, ZMHB); [1]Wante, 0°43'N 41°47'E, 16.v.1901 (B.v. Erlanger) Paratype, *det.* by Bischoff as *pedunculatoides* Bisch., *det.* as *semi. pedunculatoides* (1♂, ZMHB). Paratype, *det.* as *semi. pedunculatoides* (1♂, ZMHB).

MEASURED MATERIAL. 9♂: SOMALIA: [7]Belet Uen, 4°45'N 45°12'E, xi.1942, *det.* as *T. semistriatus* Klug (1♂, SAMC); [8]Dagahbur, Ogaden, 2°05'N 42°10'E, x-xi.1942 (T.H.E. Jackson) (1♂, NMKE). UGANDA: [3]Turkana Prov., Kabua, 3°21'N 33°15'E, 7.v.1934 (Lake Rudolf Rift Val. Expedition 1934, Brit. Mus. 1935-267) (1♂, NHML); [9]Turkana Prov., 3°21'N 33°15'E (D.R. Buxton, Lake Rudolf Rift Val. Expedition 1934, Brit. Mus. 1935-267) *det.* as *T. pedunculatus* (1♂, NHML). KENYA: [1]Sagan-Omo, Gondaraba, 30.viii.1939 (Miss E. Zavattari) *det.* by Invrea as *Tricholabiodes*

semistriatus (Kl.) (1♂, DJBC); [4]N. Turkana, Murueris Mountain, 800-1000m, 4°10'N 35°36'E (C. Arambourg, P.A. Chappuis & R. Jeannel, Mission de L'Omo, 1932-33) (1♂, MNCN); [2]Allia Bay, E. of Lake Rudolf, 3°45'N 36°15'E, 29.vi.1973, 19:55 (Mrs A. Forbes, Watson Eclipse Expedition) (1♂, NMKE); [4, 5]Archers Post, 0°39'N 37°41'E, 24-25.v.1976 (I. Bampton) at light (2♂, DJBC).

ADDITIONAL MATERIAL. 34♂: ETHIOPIA: Omo Valley, 6°50'N 36°20'E, i.1942 (H.T.E. Jackson) (1♂, NMKE). SOMALIA: Sagan-Omo, Elolo, 8.viii.1939 (Miss E. Zavattari) *det.* by Invrea as *Tricholabiodes semistriatus* (Kl.), *det.* as *pedunculatoides* (1♂, NMKE); Belet Uen, 4°45'N 45°12'E, xi.1942 (1♂, SAMC); Belet Uen, 4°45'N 45°12'E, x.1943 (1♂, SAMC); Mudugh Prov. Adado, 800 ft, 1°06'S 41°44'E, vi.1944 (T.H.E. Jackson) (1♂, NMKE); El-Bur, 4°41'N 46°37'E, vii.1945 (Patrick) (1♂, NMKE); Lugh, 3°48'N 42°33'E, xi-xii.1895 (V. Bottego) *det.* as *Tricholabiodes pedunculatus* (Kl).; *det.* by Mickel as *Tricholabiodes semistriatus pedunculatoides* (1♂, NMNH); Lugh, 3°48'N 42°33'E, xi-xii.1895 (V. Bottego) (1♂, MNHN). UGANDA: Lake Rudolf, mouth of Kabua R. 3°21'N 33°15'E, iii-iv.1931 (Dr E.B. Worthington, Cambridge Univ. Exp.; Brit. Mus. 1931-545) (1♂, BMNH). KENYA: Vez, ii.1892-93 (E. Ruspoli) *det.* as *Tricholabiodes semistriatus*, *det.* by Suárez *as Tricholabiodes pedunculatoides* Bisch. (1♂, MNHN); Lake Turkana, Allia Bay, Rocodoni Camp, 3°45'N 36°15'E, 4.viii.1980 (Operation Drake) (1♂, NMKE); Lodwar, 3°07'N 35°36'E, ii.1940 (T.H.E. Jackson) (1♂, NMKE); Turkana, S. of Sables, 800-1000m, 0°40'N 37°53'E (C. Arambourg, P.A. Chappuis & R. Jeannel, Mission de L'Omo, 1932-33) *det.* by Suárez as *Tricholabiodes pedunculatoides* Bisch. (1♂, MNHN); Archers Post, 0°39'N 37°41'E, 15.i.1973 (1♂), 24-25.v.1976 (20♂) (I. Bampton) at light (21♂, DJBC).

DISTRIBUTION

This species occurs in northeastern Africa with specimens recorded from Somalia, Uganda, Ethiopia (Suárez 1990) and Kenya (fig. 88).

DISCUSSION

Bischoff (1920) originally described this species as a subspecies of *T. semistriatus*, stating that it, except for differences in coloration, is very similar to *T. asiaticus* ♂, and *T. pedunculatus*. Invrea (1952) was not able to justify, purely on morphological or geographical grounds, the existence of the subspecies of *T. semistriatus* proposed by Bischoff (1920). I have studied two specimens from Gondaraba and Elolo, respectively ["Gondaraba / Sagan-Omo ... *Tricholabioides* [*sic*] *semistriata* [*sic*]" and "Elolo / Sagan-Omo ... *Tricholabioides* [*sic*] *semistriata* [*sic*]"], both with Invrea's determination labels. It is assumed that these two specimens form part of the group of specimens that Invrea (1952) studied. These

specimens are identified here as *T. pedunculatoides*, previously proposed by Bischoff (1920) as a subspecies of *T. semistriatus*.

Invrea (1965) again makes reference to Bischoff (1920), stating that he does not support the subspecies *T. semistriatus*, particularly since these are separated from each other only by sculpturing on T2.

Suárez (1990), in revising the Palaearctic species, recognized *T. pedunculatoides* as a separate species. The specimens referred to by André (1896b) ["Matagoi, Lugh ... *Mutilla* (*Tricholabiodes* [*sic*]) *pedunculata*"] and Magretti (1899) [Lugh (Nov., Dic. 1895)"] were identified by Bischoff (1920) and Suárez (1990) as *T. semistriatus pedunculatoides* and *T. pedunculatoides*, respectively.

This species is very similar to *T. sinuatus* and *T. parallelus*. *Tricholabiodes pedunculatoides* can easily be separated and identified from *T. parallelus* by the shape of the free border of the clypeus and the mesal margin of the metacoxa. In *T. pedunculatoides*, the free border of the clypeus is convex with a longitudinally elongate tubercle on each side of the midline and the mesal margin of metacoxa has a blunt triangular protuberance 0.25-0.50 X length of the coxa. In *T. parallelus*, the free border of the clypeus is convex with a rounded tubercle on each side of the midline and the mesal margin of the metacoxa has a thinly sclerotised triangular protuberance 0.25 X length of the coxa. Although, *T. pedunculatoides* is also very similar to *T. sinuatus*, these two species can be readily identified and separated by the shape of the longer metatibial spur. In *T. sinuatus*, the longer metatibial spur is subsigmoidal, while in *T. pedunculatoides*, the longer metatibial spur is straight.

***Tricholabiodes protuberans* sp. nov. ♂**

DIAGNOSIS

MALE: Metasoma with T1 entirely medium yellowish-brown, sometimes with narrow pale reddish-brown band at apex, T2-T6 entirely dark reddish-black, sterna paler than corresponding terga. Head with sides behind compound eyes subparallel, distinct from weakly convex posterior margin. Frons with scrobal carina arcuate, not reaching scrobal tubercle. Free border of clypeus strongly convex with a rounded tubercle on each side of midline. Middle and inner mandibular teeth separated by distance subequal to width of apical tooth, inner tooth truncate. Dorsellum with dense medium punctation, laterally ridged. No mesosternal processes. Posteriorly in basal half of mesofemur moderately concave, distal half of concavity with a weak carina dorsally. Mesal margin of metacoxa with large protruding

flange at midlength. Metasoma with anterior one-third of T2 with longitudinal rectangular reticulations, sparsely and finely punctate within each reticulation; sternum with setae denser mesally than laterally and longer than shorter mesotibial spur, anterior mesal area with slight carina < 0.5 X length of sternum, S2 without felt line. Pygidium with pygidial plate entirely densely and finely punctate, except anterolateral margin smooth; posterior margin of hypopygium concave, mesal area with longitudinal depression > 0.5 X length of sternum. Genitalia as in fig. 26.

DESCRIPTION

MALE: Length 13.44 (8.45-13.76, mean 11.51) mm. Head, including clypeus, medium yellowish-brown, antenna pale yellowish-brown; mandible almost entirely medium yellowish-brown, apex black, ventral tooth pale reddish-black; mesosoma medium yellowish-brown; legs, including coxae and tibial spurs, pale yellowish-brown; forewing lightly infuscated posterior to marginal cell; pterostigma and wing veins medium yellowish-brown; metasoma with T1 entirely medium yellowish-brown, sometimes with narrow pale reddish-brown band at apex (not present in holotype), T2-T6 entirely dark reddish-black, sterna paler than corresponding terga; entire body covered with long, pallid setae.

Head 1.44 (1.42-1.48, mean 1.44) X as wide as long, 0.98 (0.98-1.09, mean 1.04) X as wide as mesosoma, 1.64 (1.56-1.64, mean 1.59) X as wide as vertex, 1.47 (1.39-1.49, mean 1.45) X as long as compound eye, sides behind compound eyes subparallel, distinct from weakly convex posterior margin. Frons with sparse fine punctation, interspaces shiny and wider than puncture diameter; foveola deep; surface between median ocellus and foveola without longitudinal median groove though smooth and slightly longitudinally depressed but sometimes indistinct, between toruli longitudinal median groove v-shape in section and deep; scrobal carina arcuate, not reaching scrobal tubercle; antennal tubercle simple, sparsely and finely punctate. Vertex 0.76 (0.67-0.73, mean 0.71) X as long as wide, 1.22 (1.22-1.30, mean 1.28) X as wide as frons; posterior to lateral ocellus with sparse fine punctation, interspaces shiny and wider than puncture diameter. Compound eye with ommatidia distinct. Ocelli large, convex and broadly oval, median ocellus 0.99 (0.86-0.99, mean 0.91) X as long as wide, interocellar distance 1.14 (0.74-1.22, mean 1.01) X ocellocular distance. Gena irregular with dense coarse punctation, with punctures decreasing in density and size posteriorly, interspaces shiny. Clypeus 0.35 (0.34-0.38, mean 0.36) X as high as wide, free border strongly convex with a rounded tubercle on each side of midline; central portion raised, with a longitudinally oval mesal depression, rounded in section, with dense medium punctation, interspaces narrower than puncture diameter; vestiture length longer than height of clypeus. Mandible higher than thick, dorsal rim with carina along entire length,

ending at base of inner tooth; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth separated by distance subequal to width of apical tooth, inner tooth truncate; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 0.86 (0.81-0.96, mean 0.90) X height at base. Antenna with scape 2.13 (2.06-2.32, mean 2.16) X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere simple; second flagellomere 1.42 (1.32-1.50, mean 1.42) X length of first, 1.06 (1.01-1.09, mean 1.04) X length of third.

Mesosoma, excluding anterior collar, 1.64 (1.64-1.75, mean 1.69) X as long as wide. Pronotum 0.91 (0.91-0.94, mean 0.92) X as wide as mesosoma, anterodorsal surface irregular with moderate fine punctation mesally becoming shallow, pit-like reticulations laterally, slightly convex, humeral angle subrounded; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct, 3 X reticulation diameter; posterior portion of lateral surface centrally with sparse fine punctation, interspaces irregular and wider than puncture diameter, ventrally with slight longitudinal ridges, posterior margin impunctate. Mesoscutum 0.76 (0.76-0.85, mean 0.80) X as long as wide, 0.85(0.79-0.85, mean 0.82) X as wide as pronotum; between notauli entirely with moderate medium punctation, interspaces smooth and subequal to puncture diameter, posterolaterally with dense coarse punctation, interspaces narrower than puncture diameter; posterolateral corner raised as an angulate tooth. Scutellum square, entire dorsal surface densely covered with coarse subcircular punctation. Dorsellum with dense medium punctation, laterally ridged. Propodeum with areola same length or slightly longer as neighbouring areae. Mesepisternum with pit-like, shallow reticulations, reticulations approximately same size as those on anterior portion of lateral surface of pronotum, scrobe a subcircular depression, mesepisternal groove present, reticulations in groove twice as long as wide. Mesosternum with anterior concavity nearly impunctate, shiny, posteriorly becoming moderately punctate, punctures medium and ill-defined; no mesosternal processes.

Forewing: Pterostigma 0.30 (0.27-0.35, mean 0.31) X length of anterior margin of marginal cell. Marginal cell 4.43 (3.58-4.49, mean 3.80) X as long as wide, 1.46 (1.46-1.67, mean 1.50) X length of second submarginal. Second submarginal cell sessile anteriorly, 0.50 (0.47-0.51, mean 0.50) X length of discoidal cell. Third submarginal cell with vein 3r-m tubular anterior to junction with accessory vein, nebulous becoming absent posterior to junction with accessory vein; medial vein spectral; accessory vein nebulous, 1.3 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur with greatest width at midlength, posteriorly in basal half

shallowly concave, distal half of concavity with a weak carina dorsally; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.69 (0.58-0.73, mean 0.67) X length of longer spur, longer spur almost straight; basitarsus straight. Hind leg: Coxa entirely with moderate medium punctation, interspaces subequal to puncture diameter, mesal margin with large protruding flange at midlength, ventral surface convex; trochanter simple; femur with macrosetae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae sparsely but evenly distributed, shorter than shorter spur, shorter spur 0.56 (0.56-0.63, mean 0.58) X length of longer spur, longer spur almost straight, 0.81 (0.76-0.81, mean 0.78) X length of basitarsus; basitarsus with dense microsetae, macrosetae absent, ventral surface with three, often indistinct, rows of short stout spines.

Metasoma 1.20 (1.20-1.35, mean 1.26) X as long as wide. First segment moderately narrow and slightly constricted at apex, 2.13 (2.11-2.26, mean 2.19) X as long as wide, 2.77 (2.54-2.90, mean 2.73) X as long as high, 0.96 (0.89-0.96, mean 0.93) X as long as T2; tergum, except tergulum, with dense coarse subcircular punctation, tergulum moderately and finely punctate anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum with dense coarse punctation, anterior one-third with continuous irregular median carina. T2 0.94 (0.93-0.98, mean 0.95) X as long as wide, 1.07 (1.07-1.14, mean 1.10) X as wide as mesosoma, vestiture sparse, anterior one-third with longitudinal rectangular reticulations, sparsely and finely punctate within each reticulation, posterior two-thirds with dense medium punctation, interspaces shiny and narrower than puncture diameter, felt line 0.46 (0.43-0.47, mean 0.46) X length of tergum, length anterior to felt line 1.57 (0.93-1.57, mean 1.30) X length of tergum posterior to felt line; S2 convex, setae denser mesally than laterally and longer than shorter mesotibial spur, anteriorly with dense coarse punctation, interspaces irregular and narrower than puncture diameter, mesal area with slight carina < 0.5 X length of sternum, posteriorly with dense medium punctation, interspaces shiny and narrower than puncture diameter, felt line absent. Pygidium transverse, posterior margin strongly convex, anterior one-third with dense coarse punctation, interspaces irregular and narrower than puncture diameter, pygidial plate entirely with dense fine punctation, except anterolateral margin smooth; hypopygium with posterior margin concave, mesal area with longitudinal depression > 0.5 X length of sternum. Genitalia as in fig. 26.

FEMALE: Unknown.

MATERIAL EXAMINED

TYPE MATERIAL. Holotype: 1♂, "OMAN: SAYQ / 22.30N 59.06E / 540m, to light in / Wadi, 5-6.vii.1996 / 8685 B. Skule / & M.D. Gallager" (ZMHB).

Measured paratypes: 4♂: OMAN: [1]N.E. FINS, 22°56'53"N 59°11'17"E, 25 m, 4-5.iv.1996 (M.D. Gallager, 8786) to light (1♂, DJBC); [2, 3, 4]SAYQ, 22°30'N 59°06'E, 540 m, 5-6.vii.1996 (B. Skule & M.D. Gallager, 8685) to light in Wadi (3♂, DJBC).

Additional paratypes: 15♂: OMAN: N.E. FINS, 22°56'53"N 59°11'17"E, 25 m, 4-5.iv.1996 (M.D. Gallager, 8786) to light (1♂, DJBC); SAYQ, 22°30'N 59°06'E, 540 m, 5-6.vii.1996 (B. Skule & M.D. Gallager, 8685) to light in Wadi (13♂, DJBC), (B. Skule) to light in Wadi (1♂, DJBC).

ADDITIONAL MATERIAL. 5: OMAN: SAYQ, 22°30'N 59°06'E, 540 m, 5-6.vii.1996 (B. Skule & M.D. Gallager, 8685) to light in Wadi (1♂, DJBC), (B. Skule) to light in Wadi (4♂, DJBC).

DISTRIBUTION

This species occurs in southwestern Asia, with specimens recorded only from three localities within Oman (fig. 88).

DISCUSSION

Tricholabiodes protuberans is most similar to *T. femoralis*, with both species having very similar genitalia (figs 21 & 26). These two species can readily be identified from each other by the posterior shape of the head. In *T. protuberans* the sides of the head behind the compound eyes are subparallel, unlike *T. femoralis* where the sides of the head behind the compound eyes are slightly convergent posteriorly. These species can also be separated on colour. *Tricholabiodes protuberans* has T2-T6 dark reddish-black, while *T. femoralis* has the metasoma entirely medium yellowish-brown.

ETYMOLOGY

"*protuberans*" (L.), projecting; in reference to large flange at midlength on mesal margin of metacoxa.

Tricholabiodes sinuatus sp. nov. ♂

DIAGNOSIS

MALE: Metasoma with T2-T6 medium to dark reddish-brown, sometimes becoming paler posteriorly, sterna paler than corresponding terga. Head with sides behind compound eyes subparallel, distinct from weakly convex posterior margin. Free border of clypeus strongly convex with a longitudinal elongate tubercle on each side of midline. Middle and inner mandibular teeth separated by distance subequal to width of apical tooth, inner tooth truncate. Mesosternum simple, no mesosternal processes. Posteriorly

on basal half of mesofemur with a slight elongate protuberance, basitarsus slightly ventrally curved. Mesal margin of metacoxa with blunt triangular protuberance 0.5 X length of coxa; trochanter swollen ventrally; longer tibial spur subsigmoidal; basitarsus curved slightly anteriorly, ventral surface with three rows of short spines. Metasoma with anterior one-third of T2 with longitudinal rectangular reticulations, sparsely and finely punctate within each reticulation; anterior mesal area of S2 with slight carina < 0.5 X length of sternum, central area with long, erect setae longer than shorter mesotibial spur, S2 without felt line. Posterior margin of hypopygium notched, mesal area with longitudinal depression > 0.5 X length of sternum. Genitalia as in fig. 41.

DESCRIPTION

MALE: Length 13.53 (10.76-13.53, mean 11.78) mm. Head, including clypeus and antenna, pale to medium yellowish-brown; mandible almost entirely pale yellowish-brown, apex black, ventral tooth pale to medium reddish-black; mesosoma medium yellowish-brown; legs, including coxae and tibial spurs, pale yellowish-brown; forewing lightly infuscated posterior to pterostigma; pterostigma and wing veins pale to medium yellowish-brown; metasoma with T1 entirely medium yellowish-brown, T2-T6 medium to dark reddish-brown, sometimes becoming paler posteriorly, sterna paler than corresponding terga; entire body covered with long, pallid setae.

Head 1.47 (1.34-1.47, mean 1.39) X as wide as long, 0.92 (0.92-0.99, mean 0.96) X as wide as mesosoma, 1.57 (1.51-1.57, mean 1.54) X as wide as vertex, 1.47 (1.47-1.56, mean 1.53) X as long as compound eye, sides behind compound eyes subparallel, distinct from weakly convex posterior margin. Frons with sparse fine punctation, interspaces shiny and wider than puncture diameter; foveola deep; surface between median ocellus and foveola smooth without longitudinal median groove though slightly longitudinally depressed, between toruli longitudinal median groove v-shape in section and deep; scrobal carina arcuate, short not reaching scrobal tubercle but sometimes indistinct; antennal tubercle simple, with sparse fine punctation. Vertex 0.71 (0.71-0.76, mean 0.74) X as long as wide, 1.30 (1.30-1.40, mean 1.35) X as wide as frons; posterior to lateral ocellus with moderate fine punctation, interspaces shiny and subequal to puncture diameter. Compound eye with ommatidia indistinct. Ocelli large, convex and broadly oval, median ocellus 0.87 (0.84-0.91, mean 0.87) X as long as wide, interocellar distance 1.07 (1.07-1.28, mean 1.16) X ocellocular distance. Gena with sparse medium punctation, interspaces irregular and wider than puncture diameter. Clypeus 0.37 (0.35-0.37, mean 0.36) X as high as wide, free border strongly convex with a longitudinally elongate tubercle on each side of midline; central portion raised and slightly convex, with sparse fine punctation, interspaces 3 X puncture diameter; vestiture length longer than height of clypeus. Mandible higher than thick, dorsal rim with carina along entire

length, ending at base of inner tooth; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth separated by distance subequal to width of apical tooth, inner tooth truncate; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 0.85 (0.80-0.85, mean 0.83) X height at base. Antenna with scape 2.22 (2.22-2.25, mean 2.24) X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere simple; second flagellomere 1.41 (1.32-1.41, mean 1.38) X length of first, 1.04 (0.93-1.04, mean 1.00) X length of third.

Mesosoma, excluding anterior collar, 1.50 (1.50-1.64, mean 1.58) X as long as wide. Pronotum 0.88 (0.88-0.91, mean 0.90) X as wide as mesosoma, anterodorsal surface with moderate medium punctation mesally becoming pit-like, shallow reticulations laterally, strongly convex, humeral angle rounded; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct 1.5 X as large as a reticulation; posterior portion of lateral surface with sparse fine punctation, interspaces irregular and wider than puncture diameter, posterior margin impunctate. Mesoscutum 0.77 (0.77-0.80, mean 0.78) X as long as wide, 0.84 (0.83-0.85, mean 0.84) X as wide as pronotum; entirely with moderate medium punctation, interspaces smooth and subequal to puncture diameter, posterolaterally with dense coarse punctation; posterolateral corner raised as an angulate tooth. Scutellum subsquare, entire dorsal surface densely covered with pit-like reticulations. Dorsellum with dense, medium to coarse punctation, laterally ridged. Propodeum with areola same length as neighbouring areae. Mesepisternum with pit-like, shallow reticulations, reticulations approximately same size as those on anterior portion of lateral surface of pronotum, scrobe an indistinct subcircular depression, mesepisternal groove absent. Mesosternum with anterior concavity nearly impunctate, shiny, becoming moderately to densely punctate posteriorly, punctures medium and ill-defined; no mesosternal processes.

Forewing: Pterostigma 0.43 (0.41-0.57, mean 0.47) X length of anterior margin of marginal cell. Marginal cell 4.01 (3.98-4.25, mean 4.08) X as long as wide, 1.59 (1.07-1.71, mean 1.57) X length of second submarginal. Second submarginal cell sessile anteriorly, 0.51 (0.43-0.51, mean 0.48) X length of discoidal cell. Third submarginal cell with vein 3r-m tubular anterior to junction with accessory vein, nebulous becoming absent posterior to junction with accessory vein; medial vein spectral; accessory vein nebulous, 1.1 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur with greatest width at midlength, posteriorly on basal half with a slight elongate protuberance but sometimes indistinct; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.67 (0.67-0.71, mean 0.70) X length of longer spur, longer spur almost straight;

basitarsus curved slightly ventrally. Hind leg: Coxa entirely with moderate medium punctation, interspaces subequal to puncture diameter, mesal margin with blunt triangular protuberance 0.5 X length of coxa, ventral surface convex; trochanter swollen ventrally; femur with macrosetae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae sparsely but evenly distributed, shorter than shorter spur, shorter spur 0.47 (0.47-0.55, mean 0.51) X length of longer spur, longer spur subsigmoidal, 0.95 (0.86-0.95, mean 0.90) X length of basitarsus; basitarsus curved slightly anteriorly with dense microsetae, macrosetae only on posterior surface and shorter than those on tibia, ventral surface with three rows of stout spines.

Metasoma 1.15 (1.15-1.21, mean 1.18) X as long as wide. First segment moderately narrow, dorso-ventrally broad and fairly long, slightly constricted at apex, 1.92 (1.92-2.44, mean 2.24) X as long as wide, 2.47 (2.47-3.26, mean 2.88) X as long as high, 1.01 (0.97-1.01, mean 1.00) X as long as T2; tergum, except tergulum, with dense coarse subcircular punctations, interspaces irregular, tergulum with moderate fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum with dense coarse punctation, median carina interrupted. T2 0.84 (0.84-1.00, mean 0.94) X as long as wide, 1.07 (1.04-1.07, mean 1.05) X as wide as mesosoma, vestiture sparse, anterior one-third with longitudinal rectangular reticulations, sparsely and finely punctate within each reticulation, posterior two-thirds shallowly and moderately punctate, interspaces shiny and subequal to puncture diameter, felt line 0.53 (0.47-0.53, mean 0.50) X length of tergum, length anterior to felt line 1.25 (1.25-1.82, mean 1.45) X length of tergum posterior to felt line; S2 convex, centrally with long, erect setae longer than shorter mesotibial spur, anteriorly with moderate medium punctation, interspaces subequal to puncture diameter, mesal area with slight carina < 0.5 X length of sternum, posteriorly with sparse medium punctation, interspaces shiny and wider than puncture diameter, felt line absent. Pygidium transverse, posteriorly convex, posterior margin strongly convex, anterior one-third irregular and moderately punctate, interspaces subequal to puncture diameter, pygidial plate entirely with dense fine punctation, except anterolateral margins smooth, punctations decreasing in size posteriorly; hypopygium with posterior margin shallowly notched, mesal area with longitudinal depression > 0.5 X length of sternum. Genitalia as in fig. 41.

FEMALE: Unknown

MATERIAL EXAMINED

TYPE MATERIAL. Holotype: ♂, "BRIT. SOMALILAND: [= SOMALIA] / Bulhar [10°23'N 44°25'E] / 2.iii.1949 / K.M. Guichard. / B.M. 1951-406" (NHML).

Measured paratypes: 2♂: same data (2♂, NHML).

Additional paratypes: 2♂: same data (2♂, NHML).

DISTRIBUTION

This species occurs in the eastern part of North Africa, with specimens recorded from a single locality within Somalia (fig. 89).

DISCUSSION

This species is very similar to *T. pedunculatoides* and *T. parallelus*. *Tricholabiodes sinuatus* can easily be separated from *T. pedunculatoides* by the shape of the longer metatibial spur. In *T. sinuatus*, the longer metatibial spur is subsigmoidal, while in *T. pedunculatoides*, the longer metatibial spur is straight. *Tricholabiodes sinuatus* and *T. parallelus* can be separated from each other by the shape of the free border of the clypeus and the mesal margin of the metacoxa. In *T. sinuatus*, the free border of the clypeus is convex with a longitudinally elongate tubercle on each side of the midline and the mesal margin of the metacoxa has a blunt triangular protuberance 0.50 X length of the coxa. In *T. parallelus*, the free border of the clypeus is convex with a rounded tubercle on each side of the midline and the mesal margin of the metacoxa has a thinly sclerotised triangular protuberance 0.25 X length of the coxa.

ETYMOLOGY

"*sinuatus*" (L.), curved; in reference to shape of longer metatibial spurs.

***Tricholabiodes sudanensis* Suárez, 1967.** ♂

[*Mutilla* (*Tricholabiodes*)] *semistriata* Klug; André, 1903:174-175 (misidentification). ♂

[*Tricholabioides* [*sic*] *semistriata* [*sic*] (Klug)] subsp. *pedunculatoides*; Bischoff, 1920:105 (misidentification). ♂

Tricholabioides [*sic*] *semistriata* [*sic*] (Kl.[ug]); Invrea, 1932a:66 (misidentification). ♂

Tricholabioides [*sic*] *sudanensis* Suárez, 1967:561. ♂

Tricholabioides [*sic*] *sudanensis* Suárez; Suárez, 1990:170, 182, 187, figs 2(e), 3(h), 4(g),5(h), 6(g), 26, 29. ♂

Since the holotype of *T. sudanensis* was not studied, only range and mean values for all specimens studied are included in the following redescription.

DIAGNOSIS

MALE: Metasoma with T2-T6 dark reddish-brown, becoming paler posteriorly, sterna paler than corresponding terga. Head with sides behind compound eyes subparallel, distinct from weakly convex posterior margin. Free border of clypeus strongly convex with a rounded tubercle on each side of midline. Middle and inner mandibular teeth separated by distance subequal to width of apical tooth, inner tooth truncate. Mesepisternum with scrobe present, mesepisternal groove absent. Mesosternum simple, no mesosternal processes. Mesofemur with greatest width in basal third, dorsal and ventral surface subparallel, posteriorly on basal half with a slight elongate protuberance, at midlength sometimes moderately to strongly concave, if concave then with a slight carina dorsally. Mesal margin of metacoxa with short triangular protuberance 0.25-0.30 X length of coxa, basitarsus without macrosetae. Metasoma with anterior one-third of T2 with longitudinal rectangular reticulations, often vaguely resembling slight costulations, sparsely and finely punctate within each reticulation; central area of S2 with setae clumped and longer than shorter mesotibial spur, S2 without felt line, posterior margin with setae increasing in density towards the midline. S3-S6 with subequal amounts of decumbent and erect setae, setae shorter than smaller mesotibial spur. Posterior margin of hypopygium deeply notched, mesal area with longitudinal depression > 0.5 X length of sternum. Genitalia as in fig 22.

REDESCRIPTION

MALE: Length 9.96-17.05 (mean 12.20) mm. Head, including clypeus and antenna, pale to medium yellowish-brown; mandible almost entirely pale yellowish-brown, apex black, ventral tooth medium yellowish-brown to pale reddish-black; mesosoma pale to medium yellowish-brown; legs, including coxae and tibial spurs, pale yellowish-brown; forewing lightly infuscated posterior to pterostigma; pterostigma and wing veins pale yellowish-brown; metasoma with T1 entirely pale to medium yellowish-brown, T2-T6 dark reddish-brown, becoming paler posteriorly, sterna paler than corresponding terga; entire body, particularly the metasoma, covered with long, pallid setae.

Head 1.37-1.58 (mean 1.41) X as wide as long, 0.88-1.12 (mean 1.01) X as wide as mesosoma, 1.48-1.64 (mean 1.53) X as wide as vertex, 1.36-1.56 (mean 1.50) X as long as compound eye, sides behind compound eyes subparallel, distinct from weakly convex posterior margin. Frons with sparse fine punctation, interspaces shiny and wider than puncture diameter; foveola deep; surface between median ocellus and foveola smooth, without longitudinal median groove though slightly longitudinally depressed but sometimes indistinct, between toruli longitudinal median groove v-shape in section and deep; scrobal carina arcuate, not reaching scrobal tubercle but sometimes indistinct; antennal tubercle simple, sparsely and finely punctate. Vertex 0.63-0.77 (mean 0.72) X as long as wide, 1.22-1.46 (mean 1.38) X as wide

as frons; posterior to lateral ocellus with moderate fine punctation, interspaces shiny and subequal to puncture diameter. Compound eye with ommatidia distinct. Ocelli large, convex and broadly oval, median ocellus 0.76-0.98 (mean 0.85) X as long as wide, interocellar distance 0.97-1.53 (mean 1.26) X ocellocular distance. Gena with sparse to moderate, medium punctation, interspaces irregular. Clypeus 0.34-0.40 (mean 0.38) X as high as wide, free border strongly convex with a rounded tubercle on each side of midline; central portion raised and slightly convex, median area between tubercles slightly longitudinally depressed, with sparse fine punctation, interspaces 2 X puncture diameter; vestiture length longer than height of clypeus. Mandible higher than thick, dorsal rim with carina along entire length although distal part often indistinct, ending at base of inner tooth; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth separated by distance subequal to width of apical tooth, inner tooth truncate; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 0.76-1.20 (mean 0.83) X height at base. Antenna with scape 2.04-2.37 (mean 2.20) X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere simple; second flagellomere 1.30-1.56 (mean 1.45) X length of first, 0.99-1.12 (mean 1.02) X length of third.

Mesosoma, excluding anterior collar, 1.47-1.82 (mean 1.63) X as long as wide. Pronotum 0.86-0.95 (mean 0.90) X as wide as mesosoma, anterodorsal surface with moderate medium punctation mesally becoming pit-like shallow reticulations laterally, strongly convex, humeral angle subrounded; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct and almost as large as a reticulation; posterior portion of lateral surface rough striated with sparse fine punctation, interspaces wider than puncture diameter, posterior margin impunctate. Mesoscutum 0.76-0.87 (mean 0.78) X as long as wide, 0.78-0.86 (mean 0.82) X as wide as pronotum; entirely with sparse to moderate, medium punctation, interspaces smooth posterolaterally with dense coarse punctation; posterolateral corner raised as an angulate tooth. Scutellum subsquare, entire dorsal surface densely covered with pit-like reticulations. Dorsellum with dense, medium to coarse punctation, laterally ridged. Propodeum with areola longer than neighbouring areae. Mesepisternum with pit-like, shallow reticulations, reticulations approximately same size as those on anterior portion of lateral surface of pronotum, scrobe an indistinct subcircular depression, mesepisternal groove absent. Mesosternum with anterior concavity nearly impunctate, shiny, posteriorly becoming moderately to densely punctate, punctures medium and ill-defined; no mesosternal processes.

Forewing: Pterostigma 0.36-0.53 (mean 0.47) X length of anterior margin of marginal cell. Marginal cell 3.94-4.63 (mean 4.32) X as long as wide, 1.28-1.96 (mean 1.50) X length of second submarginal.

Second submarginal cell sessile anteriorly, 0.40-0.62 (mean 0.53) X length of discoidal cell. Third submarginal cell with vein 3r-m tubular anterior to junction with accessory vein, nebulous becoming absent posterior to junction with accessory vein; medial vein spectral; accessory vein nebulous, 1.2 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur with greatest width in basal third, dorsal and ventral surface subparallel, posteriorly on basal half with slight elongate protuberance, at midlength sometimes moderately to strongly concave, if concave with slight carina dorsally; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.60-0.80 (mean 0.75) X length of longer spur, longer spur almost straight; basitarsus straight. Hind leg: Coxa entirely with sparse punctation, interspaces wider than puncture diameter, mesal margin with short triangular protuberance 0.25-0.30 X length of coxa, ventral surface convex; trochanter slightly swollen ventrally; femur with macrosetae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae sparsely but evenly distributed, shorter than shorter spur, shorter spur 0.60-0.75 (mean 0.68) X length of longer spur, longer spur almost straight, 0.69-1.10 (mean 0.80) X length of basitarsus; basitarsus with dense microsetae, macrosetae absent, ventral surface with two, often indistinct rows, of short stout spines.

Metasoma 1.04-1.48 (mean 1.29) X as long as wide. First segment moderately narrow and fairly long, slightly constricted at apex, 1.95-2.48 (mean 2.24) X as long as wide, 2.47-2.91 (mean 2.60) X as long as high, 0.86-1.11 (mean 1.04) X as long as T2; tergum, except tergulum, with dense coarse subcircular punctation, tergulum with moderate fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum with dense coarse punctation, median carina absent. T2 0.84-1.03 (mean 0.90) X as long as wide, 0.97-1.13 (mean 1.07) X as wide as mesosoma, vestiture subdecumbent to suberect, anterior one-third with longitudinal rectangular reticulations, often resembling slight costulations, sparsely and finely punctate within each reticulation, posterior two-thirds shallowly and moderately punctate, interspaces shiny and subequal to puncture diameter, felt line 0.43-0.56 (mean 0.49) X length of tergum, length anterior to felt line 1.00-1.68 (mean 1.23) X length of tergum posterior to felt line; S2 convex, setae centrally clumped and longer than shorter mesotibial spur, anteriorly with dense coarse punctation, interspaces irregular and narrower than puncture diameter, mesal area with very slight carina < 0.5 X length of sternum, posteriorly with moderate medium punctation, interspaces shiny and subequal to puncture diameter, felt line absent, posterior margin with setae increasing in density towards the midline. S3-S6 with subequal amounts of decumbent and erect setae, setae shorter than smaller mesotibial spur. Pygidium transverse, posterior margin strongly convex, anterior one-third irregular with dense coarse punctations, pygidial plate entirely with dense fine

punctation, except anterolateral margins smooth; hypopygium with posterior margin deeply notched, mesal area with longitudinal depression > 0.5 X length of sternum. Genitalia as in fig. 22.

FEMALE: Unknown.

Holotype: ♂, "[ERITREA:] Assab [13°00'30"N 42°44'29"E], XII-84, FRASCA; *semistriata* [*sic*] Kl; *Tricholabioides*, *semistriata* [*sic*] Kl., (*pedunculata* Kl.), ♂ Det. ERN. ANDRÉ 1908, *pedunculatoides* BISCH." (MCSN).

MATERIAL EXAMINED

TYPE MATERIAL. Measured paratypes: 5♂: LIBYA: [1,2]Cyrenaica, R.U. Agrario, Giarabab, 31°00'N 22°30'E, 5.viii (C. Kruger) *det.* by Invrea as *semistriatus* (Kl.), *det.* by Invrea as *Trichol. semistriatus* (Kl.) (2♂, MCSN). EGYPT: [4,5]El Kharga, Kharga Oasis, 25°26'N 30°33'E, 7.v.1965 (K.V. Krombein) collected at light (1♂, NMNH) (1♂, MNCN). CAMEROON: [3]Mokolo, 3°44.N 9°57'E, X.1963 (Nonveiller) (1♂, NONV).

MEASURED MATERIAL. 17♂: SAUDI ARABIA: [2]W. Coast, Al Lith, 20°09'N 40°16'E, 8.xii.1945 (D.V. Fitzgerald, B. M. 1946-363) to light, among maritime vegetation (*Suaeda*)(1♂, NHML). NIGER: [5]Agadez, S. of Aïr, 525m, Ifan, 2.viii.1947 (L. Chopard & A. Villiers) *det.* as *semistriatus* (1♂, MNHN); [6]Aïr Massif, Iberkom, 18°55'N 8°40'E, 22.viii.1983 (P.C. Matteson) (1♂, UCDC); [7]Air Massif, Taquei, 18°43'N 8°41'E, 26.viii.1983 (Patricia C. Matteson) riparian vegetation (1♂, NHML), [8,9]*det.* by Morgan as *Tricholabiodes* (2♂, NHML). SUDAN: [15]Tumeirab, 17°37'N 33°55'E, 3.ii.1919 (H.W. Bedford, Brit. Mus. 1930-565, C8834, 17046) *det.* by Uvarov as *Tricholabiodes semistriatus pedunculatus* (Kl.) (1♂, NHML). SENEGAL: [11,12]Richard Toll, 25-35 Km S., 16°25'N 15°42'W, 10.ii-4.iii.1989 (H. v.d. Valk c.s.) malaise trap (2♂, LBWG); [1]Louga, 15°37'N 16°13'W, 8.v.1983 (J.W. Evers) malaise in rice plantation (1♂, LBWG). NIGERIA: [10]Logomani, 12°12'N 14°10'E, 2.iv.1951 (J.L. Gregory) at light (1♂, NHML), [3,4](J.L. Gregory, D63) at light (2♂, NHML). DJIBOUTI: [13]Obock, 11°59'N 43°20'E, 1893 (M. Maindron) *det.* by André as *Mutilla pedunculata* Kl., *det.* as *semistriatus* (Kl.), *det.* as *pedunculatoides* Bisch. (paratype) (1♂, MNHN); [17]Djibouti, 11°36'N 43°09'E, 1893 (M. Maindron) (1♂, MNHN), [16]4.iii.1909 (A. Bonhoure) *det.* by Suárez as *Tricholabiodes sudanensis* Suár (1♂, MNHN). Locality indeterminate: [14]Fleuve Blanc, 1843 (D'Arnaud) *det.* as *T. semistriatus* (Kl.) (1♂, MNHN).

ADDITIONAL MATERIAL. 32♂: EGYPT: Siwa, 29°11'N 25°31'E, 20-21.vii.1935 (J. Omer-

Cooper, Armstrong College Exp, B.M. 1935-354) (2♂, NHML). NIGER: Aïr Massif, Iberkom, 18°55'N 8°40'E, 22.viii.1983 (P.C. Matteson) (4♂, UCDC); Air Massif, Taquei, 18°43'N 8°41'E, 26.viii.1983 (Patricia C. Matteson) riparian vegetation (1♂, NHML) (1♂, UCDC), light trap (4♂, UCDC); Niger-Niamey Centre Aghrymet, d'eau, 13°31'N 2°07'E, vii.1988 (J. Holland) (1♂, LBWG). SENEGAL: Richard Toll, 25-35 Km S., 16°25'N 15°42'W, 10.ii-4.iii.1989 (H. v.d. Valk c.s.) malaise trap (2♂, LBWG); Gillon, Fété-Olé, Ferlo, 16°08'N 13°59'W, 23.ix.1971 (B10 H) *det.* by Nonveiller as *Tricholabiodes sudanensis* Suárez (1♂, NONV). NIGERIA: Logomani, 12°12'N 14°10'E, 18.iii.1951 (J.L. Gregory, D62, com. inst. ent. coll. no. 12127) at light, *det.* by Nixon as *Tricholabiodes semistriatus* (Kl.) (1♂, NHML); Logomani, 12°12'N 14°10'E, 12.iii.1951 (J.L. Gregory, D62) at light (1♂, NHML), 5.iii-29.iv.1951 (J.L. Gregory) at light (12♂, NHML), 22.iii.1951 (J.L. Gregory) at light (1♂, NHML). CAMEROON: Guétalé, Moro, 11°03'N 14°09'E, ii.1968 (Nonveiller) (1♂, NONV); Guétalé, 10°04'N 14°30'E, iv.1970 (Nonveiller) (1♂, NONV).

DISTRIBUTION

This species occurs across North Africa and southwestern Asia, with specimens recorded from Saudi Arabia, Libya (Suárez 1967, 1990), Egypt, Niger, Mali (Suárez 1990), Chad (Suárez 1967, 1990), Sudan, Nigeria, Senegal, Eritrea, Djibouti, Cameroon and Ethiopia (Suárez 1967, 1990) (fig. 89).

DISCUSSION

This species was described by Suárez (1967) from several specimens, with the best preserved specimen, collected by Frasca, designated as the holotype. Suárez's (1990) redescription of *T. sudanensis* is accompanied with diagrams of diagnostic characters including genitalia. *Tricholabiodes sudanensis* is also included in a key to some of the Palaearctic species and a catalogue to virtually all described species of the genus (Suárez 1990).

André's (1903) redescription of *M* (*Tricholabiodes*) *semistriata* is based on specimens from three different localities. Except for distributional information ["PATRIE: Egypte, Arabie, Obock [Djibouti]"], André provided no other information about the specimens. I have studied a specimen from Obock ["... M. Maindron / Obock / 1893"; "*Mutilla* / (*Tricholaboides* [*sic*]) / *pedunculata* Kl."; " ERN. ANDRÉ det."] which agrees with André's redescription and has a determination label by André. With this specimen matching André's (1903) redescription, both morphologically and geographically, and with André's determination label attached, it is assumed that André partly based his description on this specimen. Bischoff (1920), in describing subspecies *pedunculatoides*, designated this particular specimen (from Obock) as a paratype ["...*pedunculatoides* / Bisch. / Paratype"]. The information on

the specimen label is the same as given in the description of subspecies *pedunculatoides*. This specimen vaguely agrees with the description of subspecies *pedunculatoides* but is not conspecific with the holotype and several of the other paratypes. It is identified here as *T. sudanensis*. [Another specimen from Obock, with a similar determination label by André and designated by Bischoff (1920) as a paratype of subspecies *pedunculatoides* has been identified as *T. arabicus*].

Invrea (1932a) briefly discusses a specimen collected at Giarabab, identifying it as *T. semistriatus*. Invrea mentions that the specimen is of the definite form, typical of *T. semistriatus*, as described by Bischoff (1920). I have not seen this specimen but it has been identified by Suárez as, and is included as one of the paratypes of, *T. sudanensis*.

Since Suárez (1967, 1990) gave two detailed descriptions of *T. sudanensis*, it is relatively easy, even in the absence of the holotype, to identify this species using the descriptions and key (Suárez 1990). The paratypes studied match Suárez's descriptions exactly. The information provided on the holotype label was transcribed from the original description (Suárez 1967).

Tricholabiodes sudanensis is a fairly variable species but has the following diagnostic features. The mesofemur has the greatest width in the basal third, thus the dorsal and ventral margins are subparallel. Specimens occurring from central North Africa (Niger, Nigeria, Chad and Sudan) have the mesofemur strongly concave posteriorly with dense pubescence within the concavity. Specimens from Oman and the eastern parts of Saudi Arabia have the posterior part of the mesofemur only very slightly concave, but the basal third of the mesofemur is slightly more enlarged than the African specimens. Four specimens from Senegal (West Coast of Africa) do not have the posterior part of the mesofemur concave. When viewing this variation in mesofemur structure in isolation and without consideration of the variation shown by this character, the specimens appear very different, possibly warranting their placement into separate species (based on this character) or at least into subspecies. All the specimens, no matter from what locality, are all very similar in the other diagnostic features of the species, thus not warranting division into separate species. The varieties are not geographically isolated. I have not seen any specimens of *T. sudanensis* from Mali, but Suárez (1990) has recorded specimens from there.

This species is most similar to *T. trochantalis* but can be separated by the following characters: sculpturing on the mesal margin of the metacoxa and the position and length of the setae on S2. In *T. sudanensis*, the mesal margin of the metacoxa has a short blunt protuberance, varying in length from 0.25-0.50 X length of the coxa and the mesal area of S2 has long fairly thick setae which are denser than

the lateral setae. In *T. trochantalis*, the mesal margin of the metacoxa is with a short triangular protuberance 0.25 X length of the coxa and S2 has setae evenly spaced and shorter than the shorter mesotibial spur. This species is also similar to *T. femoralis*, with both species having almost identical genitalia. *Tricholabiodes femoralis* is easily recognizable by its pale coloration and the mesofemur is not as robust as in *T. sudanensis*. Nor are the setae on S2 as long or clumped as in *T. sudanensis*.

***Tricholabiodes pedunculatus* (Klug, 1829). ♂**

Mutilla pedunculata Klug, 1829:tab. 5, fig. 10. ♂

Mutilla pedunculata Klug; Sichel & Radoszkowski, 1869:263. ♂

Mutilla pedunculata Klug; Gribodo, 1884:390. ♂

T. [*richolabiodes*] *pedunculata* [*sic*] Klug; Radoszkowski, 1885:35, figs 48a-c. ♂

[*Mutilla* (*Tricholabiodes*)] *pedunculata* Klug; André, 1896a:267. ♂

Mutilla pedunculata Klug; Fox, 1896:547. ♂

[*Mutilla*] *pedunculata* Klug; Dalla Torre, 1897:71. ♂

M. [*utilla*] *pedunculata* Klug; André, 1899:24. ♂

[*Mutilla* (*Tricholabiodes*)] *pedunculata* [Klug]; André, 1901:286. ♂

[*Mutilla* (*Tricholabiodes*)] *semistriata* Klug; André, 1903:172, Pl. 7(2-3) (in part). ♂?

T. [*richolabioides* [*sic*]] *semitriata* [*sic*] (Klug); Magretti, 1905:39. ♂

Tricholabiodes semistriata [*sic*] (Klug); André, 1910:32. ♂

Tricholabioides [*sic*]] *semistriata* [*sic*] (Klug); Bischoff, 1920:103, 104. ♂

[*Tricholabioides* [*sic*]] *pedunculata* [*sic*] (Kl.[ug]); Bischoff, 1920:107. ♂

[*Tricholabioides* [*sic*]] *semistriata* [*sic*] (Kl.[ug]); Invrea, 1932b:462. ♂

Tricholabioides [*sic*] *semistriata* [*sic*] (Kl.[ug]); Invrea, 1936:119. ♂

Tricholabioides [*sic*] *semistriata* [*sic*] (Klug); Suárez, 1963:922, fig. 3. ♂

[*Tricholabioides* [*sic*]] *pedunculata* [*sic*] (Klug); Suárez, 1977:218,219. ♂

Tricholabioides [*sic*] *pedunculata* [*sic*] (Klug); Suárez, 1990:153, 182, 187, figs 1(c), 2(d), 3(a), 4(i-k), 5(j), 6(h), 7(b), 19. ♂

Since the lectotype of *T. pedunculata* was not studied, only range and mean values for all specimens studied are included in the following redescription.

DIAGNOSIS

MALE: Metasoma with T1 entirely medium yellowish-brown, T2-T6 dark reddish-brown to black, becoming paler posteriorly, sterna paler than corresponding terga. Head with sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Free border of clypeus with a rounded tubercle on each side of midline. Middle and inner mandibular teeth separated by distance subequal to width of apical tooth, inner tooth truncate. Mesepisternum with scrobe present, mesepisternal groove absent. Mesosternum simple, no mesosternal processes. Mesofemur with greatest width at midlength, although slightly widened proximally. Mesal margin of metacoxa with triangular protuberance 0.30-0.40 X length of coxa, apex of protuberance slightly hook-like, weakly sclerotised, trochanter slightly swollen ventrally. Metasoma with anterior two-thirds of T2 with longitudinal rectangular reticulations, sparsely and finely punctate within each reticulation; anterior mesal area of S2 simple, S2 without felt line, posterior margin with setae increasing in density towards the midline. Posterior margin of hypopygium deeply notched, mesal area with longitudinal depression > 0.5 X length of sternum but sometimes indistinct. Genitalia as in fig. 24.

REDESCRIPTION

MALE: Length 10.68-13.19 (mean 12.80) mm. Head, including clypeus, medium yellowish-brown, antennae pale yellowish-brown; mandible, almost entirely medium yellowish-brown, apex black, ventral tooth dark yellowish-brown; mesosoma medium yellowish-brown; legs, including coxae and tibial spurs, pale yellowish-brown; forewing very lightly infuscated posterior to marginal cell; pterostigma and wing veins pale yellowish-brown; metasoma with T1 entirely medium yellowish-brown, T2-T6 dark reddish-brown to black, becoming paler posteriorly, sterna paler than corresponding terga; entire body covered with long, pallid setae.

Head 1.42-1.46 (mean 1.45) X as wide as long, 0.94-0.98 (mean 0.96) X as wide as mesosoma, 1.50-1.52 (mean 1.51) X as wide as vertex, 1.49-1.55 (mean 1.52) X as long as compound eye, sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly posterior margin. Frons, anteriorly between toruli, with sparse fine punctation, interspaces wider than puncture diameter; foveola deep; surface between median ocellus and foveola smooth, without longitudinal median groove, between toruli longitudinal median groove subrounded in section and shallow; scrobal carina arcuate, extending to scrobal tubercle; antennal tubercle simple, with sparse fine punctation. Vertex 0.60-0.68 (mean 0.62) X as long as wide, 1.27-1.34 (mean 1.29) X as wide as frons; posterior to lateral ocellus with sparse, fine to medium punctation, interspaces shiny and wider than puncture diameter. Compound eye with ommatidia distinct. Ocelli large, convex and broadly oval, median ocellus 0.81-0.90 (mean

0.85) X as long as wide, interocellar distance 1.26-1.35 (mean 1.28) X ocellocular distance. Gena with sparse to moderate, medium punctation, interspaces irregular. Clypeus 0.38-0.39 (mean 0.38) X as high as wide, free border strongly convex with a rounded tubercle on each side of midline; central portion raised and slightly convex, with sparse fine punctation, interspaces 2 X puncture diameter; vestiture length longer than height of clypeus. Mandible higher than thick, dorsal rim with carina along entire length, although proximally weak, ending at base of inner tooth; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth separated by distance subequal to width of apical tooth, inner tooth truncate; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 0.79-1.00 (mean 0.81) X height at base. Antenna with scape 1.90-2.17 (mean 2.04) X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere simple; second flagellomere 1.46-1.47 (mean 1.46) X length of first, 1.04-1.06 (mean 1.05) X length of third.

Mesosoma, excluding anterior collar, 1.63-1.75 (mean 1.67) X as long as wide. Pronotum 0.89-0.93 (mean 0.92) X as wide as mesosoma, anterodorsal surface with moderate, fine to medium punctation, strongly convex, humeral angle subsquare; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct and larger than a reticulation; posterior portion of lateral surface irregular with sparse fine punctation, interspaces wider than puncture diameter, posterior margin impunctate. Mesoscutum 0.77-0.82 (mean 0.79) X as long as wide, 0.79-0.83 (mean 0.81) X as wide as pronotum; entirely with sparse to moderate, medium punctation, interspaces smooth, posterolaterally with dense, medium to coarse punctation; posterolateral corner raised as an angulate tooth. Scutellum subsquare, entire dorsal surface densely covered with coarse subcircular punctation. Dorsellum with dense, fine to medium punctation, laterally ridged. Propodeum with areola longer than neighbouring areae. Mesepisternum, anterior to scrobe with moderate to dense, medium punctation, punctures increasing in density and size posteriorly, posterior to scrobe with pit-like, shallow reticulations, reticulations approximately same size as those on anterior portion of lateral surface of pronotum, scrobe a distinct subcircular depression, mesepisternal groove absent. Mesosternum with anterior concavity nearly impunctate, shiny, posteriorly sparsely punctate, punctures fine and ill-defined; no mesosternal processes.

Forewing: Pterostigma 0.49-0.62 (mean 0.52) X length of anterior margin of marginal cell. Marginal cell 3.85-4.84 (mean 4.30) X as long as wide, 1.47-1.97 (mean 1.63) X length of second submarginal. Second submarginal cell sessile anteriorly, 0.38-0.48 (mean 0.41) X length of discoidal cell. Third submarginal cell with vein 3r-m tubular anterior to junction with accessory vein, nebulous becoming

spectral posterior to junction with accessory vein; medial vein spectral; accessory vein nebulous, 1.1 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur with greatest width at midlength, although slightly widened proximally; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.74-0.78 (mean 0.75) X length of longer spur, longer spur almost straight; basitarsus straight. Hind leg: Coxa entirely with sparse punctation, interspaces wider than puncture diameter, mesal margin with triangular protuberance 0.30-0.40 X length of coxa, apex of protuberance slightly hook-like, weakly sclerotised, ventral surface convex; trochanter slightly swollen ventrally; femur with macrosetae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae sparsely but evenly distributed, shorter than shorter spur, shorter spur 0.67-0.68 (mean 0.67) X length of longer spur, longer spur almost straight, 0.81-0.87 (mean 0.84) X length of basitarsus; basitarsus with dense microsetae, macrosetae absent, ventral surface with two, often indistinct rows, of short stout spines.

Metasoma 1.29-1.37 (mean 1.32) X as long as wide. First segment moderately narrow and fairly long, slightly constricted at apex, 2.28-2.40 (mean 2.35) X as long as wide, 2.69-2.87 (mean 2.75) X as long as high, 0.91-0.96 (mean 0.95) X as long as T2; tergum, except tergulum, with dense coarse subcircular punctation, tergulum with moderate fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum with dense coarse punctation, median carina absent. T2 0.99-1.01 (mean 1.00) X as long as wide, 1.04-1.11 (mean 1.07) X as wide as mesosoma, vestiture subdecumbent to suberect, anterior two-thirds with longitudinal rectangular reticulations, sparsely and finely punctate within each reticulation, posterior one-third with sparse to moderate and fine to medium punctation, punctures decreasing in density and size posteriorly, interspaces shiny and wider than puncture diameter, felt line 0.44-0.48 (mean 0.45) X length of tergum, length anterior to felt line 1.25-1.35 (mean 1.30) X length of tergum posterior to felt line; S2 convex, setae evenly distributed and shorter than shorter mesotibial spur, anteriorly with dense coarse punctation, interspaces irregular and narrower than puncture diameter, mesal area without carina, posteriorly with sparse, fine to medium punctation, punctures decreasing in density and size posteriorly, interspaces shiny and wider than puncture diameter, felt line absent. Pygidium with posterior margin strongly convex, anterior one-third irregular with dense coarse punctations, pygidial plate entirely densely and finely punctate, except anterolateral margins smooth; hypopygium with posterior margin deeply notched, mesal area with longitudinal depression > 0.5 X length of sternum but sometimes indistinct. Genitalia as in fig. 24.

FEMALE: Unknown.

Lectotype: ♂, "Arab. des. Ehrbg, *peduncula*, *ta* Kl.; Wüstes, Arabien, Ehrenbg S.; 6790; *pedunculata*, Kl. Type; *semistriata*, Kl. det. BISCHOFF" (1♂).

MATERIAL EXAMINED

TYPE MATERIAL. Measured paralectotypes: 2♂: SAUDI ARABIA: [1]Wüstes (S. Ehrenbg, 6790) Type *pedunculatus* Kl, *det.* by Bischoff as *semistriatus* (Kl)., *det. & designated* by Suárez as PARALECTOTYPE *T. pedunculatus* ♂ (Klug) (1♂, ZMHB); [2]no locality, Type *pedunculatus* Kl., *det.* by Bischoff as *semistriatus* (Kl.), *det. & designated* by Suárez as PARALECTOTYPE *T. pedunculatus* (K.) (1♂, ZMHB).

MEASURED MATERIAL. 1♂: SAUDI ARABIA: Al Hanakiyah, 24°53'N 40°30'E, iv.1944 (D.V. Fitzgerald, B.M. 1946-363) (1♂, NHML).

DISTRIBUTION

This species occurs in North Africa and southwestern Asia with specimens recorded from Egypt (Suárez 1990), Saudi Arabia and Oman (Suárez 1990) (fig. 90).

DISCUSSION

The lectotype of *T. pedunculatus* was not seen. The information on the lectotype label, given above, was transcribed from the redescription by Suárez (1990). Although I have not studied the lectotype, I am certain that the above specimens have been correctly identified as *T. pedunculatus* and that the above redescription is an accurate description of the species. All paralectotypes and measured material studied match Klug's (1829) and Suárez's descriptions (1990) and figures (Suárez 1990) exactly. Using Suárez's (1990) key, all specimens key out as *T. pedunculatus*.

This species, because of the synonymy, by André (1903), of *M. pedunculata* ♂, with *M. semistriata* ♀, has caused a certain degree of confusion in the literature (refer to Chapter 2: Historical review of *Tricholabiodes*). From the synonymy list above and the synonymy list in other descriptions, it can be seen that there have been numerous, often incorrect, references to *T. pedunculatus*. Since I have not studied all specimens previously referred to or identified as *T. pedunculatus*, it is impossible to ascertain whether the specimens referred to in the synonymy list preceding this redescription were correctly identified.

Tricholabiodes pedunculatus is very similar to *T. palaestinensis* but can easily be separated and readily

identified from *T. palaestinensis* by the shape of the head behind the compound eyes and the position of the setae on S3-S6. *Tricholabiodes pedunculatus* has the head with sides behind the compound eyes slightly convergent posteriorly and S3-S6 has all macrosetae decumbent. In *T. palaestinensis*, the head is with sides behind the compound eyes subparallel and S3-S6 has subequal amounts of flat and erect macrosetae.

***Tricholabiodes palaestinensis* Suárez, 1967. ♂**

Tricholabioides [*sic*] *pedunculata* [*sic*] *palaestinensis* Suárez, 1967:563. ♂

[*Tricholabioides* [*sic*]] *palaestinensis* [Suárez]; Suárez, 1977:218. ♂

Tricholabioides [*sic*] *pedunculata* [*sic*] *palaestinensis* Suárez; Suárez, 1990:158, 182, 187, figs. 23. ♂

DIAGNOSIS

MALE: Metasoma with T2-T6 dark reddish-brown, becoming paler posteriorly, sterna paler than corresponding terga. Head with sides behind compound eyes subparallel, distinct from weakly convex posterior margin. Free border of clypeus strongly convex with rounded tubercle on each side of midline. Middle and inner mandibular teeth separated by distance subequal to width of apical tooth, inner tooth truncate. Mesepisternum with scrobe present, mesepisternal groove absent. Mesosternum simple, no mesosternal processes. Mesofemur with greatest width at midlength, although slightly widened proximally. Mesal margin of metacoxa with short triangular protuberance 0.25-0.30 X length of coxa, apex of protuberance blunt, weakly sclerotised; trochanter slightly swollen ventrally. Metasoma with anterior one-third of T2 with longitudinal rectangular reticulations, sparsely and finely punctate within each reticulation; anterior mesal area of S2 without carina, centrally with setae as long as shorter mesotibial spur, S2 without felt line. S3-S6 with subequal amounts of decumbent and erect setae, setae shorter than smaller mesotibial spur. Posterior margin of hypopygium deeply notched, mesal area with longitudinal depression > 0.5 X length of sternum. Genitalia as in fig. 25.

REDESCRIPTION

MALE: Length 13.85 (9.75-13.85, mean 9.80) mm. Head, including clypeus and antenna, pale reddish-brown, sometimes slightly darkened between ocelli; mandible, including ventral tooth, almost entirely dark yellowish-brown to pale reddish-brown, apex black; mesosoma pale to medium reddish-brown; legs, including coxae, pale reddish-black; tibial spurs medium yellowish-brown; forewing

lightly infuscated posterior to marginal cell; pterostigma and wing veins pale yellowish-brown; metasoma with T1 entirely medium to dark reddish-brown, T2-T6 dark reddish-brown, becoming paler posteriorly, sterna paler than corresponding terga; entire body, particularly the metasoma, covered with long, pallid setae.

Head 1.37 (1.37-1.59, mean 1.52) X as wide as long, 0.88 (0.88-1.10, mean 0.99) X as wide as mesosoma, 1.52 (1.45-1.69, mean 1.50) X as wide as vertex, 1.58 (1.30-1.58, mean 1.37) X as long as compound eye, sides behind compound eyes subparallel, distinct from weakly convex posterior margin. Frons, anteriorly between toruli, with moderate medium punctation, interspaces subequal to puncture diameter, posteriorly with moderate, fine to medium punctation, interspaces wider than puncture diameter; foveola deep; surface between median ocellus and foveola smooth, without longitudinal median groove, between toruli longitudinal median groove subrounded in section and shallow; scrobal carina arcuate, not reaching scrobal tubercle; antennal tubercle simple, with sparse fine punctation. Vertex 0.72 (0.58-0.75, mean 0.60) X as long as wide, 1.36 (1.35-1.50, mean 1.44) X as wide as frons; posterior to lateral ocellus with sparse fine punctation, interspaces shiny and wider than puncture diameter. Compound eye with ommatidia distinct. Ocelli large, convex and broadly oval, median ocellus 0.89 (0.80-1.00, mean 0.96) X as long as wide, interocellar distance 1.06 (1.05-1.40, mean 1.26) X ocellocular distance. Gena with sparse to moderate, medium punctation, interspaces irregular. Clypeus 0.39 (0.38-0.44, mean 0.41) X as high as wide, free border strongly convex with rounded tubercle on each side of midline; central portion raised and slightly convex, with sparse fine punctation, interspaces 2 X puncture diameter; vestiture length longer than height of clypeus. Mandible higher than thick, dorsal rim with carina only on proximal half; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth separated by distance subequal to width of apical tooth, inner tooth truncate; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely acute, mandibular height across ventral tooth 0.89 (0.76-0.90, mean 0.81) X height at base. Antenna with scape 2.00 (2.00-2.37, mean 2.32) X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere simple; second flagellomere 1.40 (1.32-1.58, mean 1.43) X length of first, 1.08 (0.99-1.15, mean 1.05) X length of third.

Mesosoma, excluding anterior collar, 1.69 (1.50-1.85, mean 1.67) X as long as wide. Pronotum 0.90 (0.84-0.97, mean 0.92) X as wide as mesosoma, anterodorsal surface with moderate, fine to medium punctation, strongly convex, humeral angle subsquare; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct and larger than a reticulation; posterior portion of lateral surface irregular with sparse fine punctation, interspaces wider than puncture diameter, posterior margin

impunctate. Mesoscutum 0.85 (0.73-0.89, mean 0.83) X as long as wide, 0.83 (0.77-0.85, mean 0.84) X as wide as pronotum; entirely with sparse to moderate, medium punctation, interspaces smooth, posterolaterally with dense coarse punctation; posterolateral corner raised as an angulate tooth. Scutellum subsquare, entire dorsal surface densely covered with coarse subcircular punctation. Dorsellum with dense, fine to medium punctation, laterally ridged. Propodeum with areola longer than neighbouring areae. Mesepisternum with pit-like, shallow reticulations, reticulations approximately same size as those on anterior portion of lateral surface of pronotum, scrobe a distinct subcircular depression, mesepisternal groove absent. Mesosternum with anterior concavity nearly impunctate, shiny, posteriorly sparsely punctate, punctures fine and ill-defined; no mesosternal processes.

Forewing: Pterostigma 0.49 (0.40-0.53, mean 0.52) X length of anterior margin of marginal cell. Marginal cell 3.74 (3.60-4.02, mean 3.75) X as long as wide, 1.37 (1.34-1.75, mean 1.40) X length of second submarginal. Second submarginal cell sessile anteriorly, 0.50 (0.44-0.63, mean 0.53) X length of discoidal cell. Third submarginal cell with vein 3r-m tubular anterior to junction with accessory vein, nebulous becoming spectral posterior to junction with accessory vein; medial vein spectral; accessory vein nebulous, 1.1 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur with greatest width at midlength, although slightly widened proximally; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.71 (0.63-0.81, mean 0.75) X length of longer spur, longer spur almost straight; basitarsus straight. Hind leg: Coxa entirely with sparse punctation, interspaces wider than puncture diameter, mesal margin with short triangular protuberance 0.25-0.30 X length of coxa, apex of protuberance blunt, weakly sclerotised, ventral surface convex; trochanter slightly swollen ventrally; femur with macrosetae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae sparsely but evenly distributed, shorter than shorter spur, shorter spur 0.63 (0.59-0.76, mean 0.71) X length of longer spur, longer spur almost straight, 0.82 (0.68-0.95, mean 0.72) X length of basitarsus; basitarsus with dense microsetae, macrosetae on posterior surface, ventral surface with two rows of short stout spines.

Metasoma 0.99 (0.80-1.05, mean 0.84) X as long as wide. First segment moderately narrow and fairly long, slightly constricted at apex, 2.40 (1.99-2.40, mean 2.11) X as long as wide, 3.00 (2.50-3.00, mean 2.64) X as long as high, 1.08 (0.90-1.11, mean 1.05) X as long as T2; tergum, except tergulum, with dense coarse subcircular punctation, tergulum with moderate fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum with dense coarse punctation, median carina absent. T2 0.85 (0.80-0.98, mean 0.86) X as long as wide, 1.00 (0.96-1.15,

mean 1.07) X as wide as mesosoma, vestiture subdecumbent to suberect, anterior one-third with longitudinal rectangular reticulations, sparsely and finely punctate within each reticulation, posterior two-thirds with sparse to moderate, fine punctation, interspaces shiny and wider than puncture diameter, felt line 0.47 (0.40-0.55, mean 0.45) X length of tergum, length anterior to felt line 1.20 (1.20-1.58, mean 1.40) X length of tergum posterior to felt line; S2 convex, setae as long as shorter mesotibial spur, anteriorly with moderate medium punctation, interspaces irregular and subequal to puncture diameter, mesal area without carina, posteriorly with sparse to moderate and fine to medium punctation, punctures decreasing in density and size posteriorly, interspaces shiny and wider than puncture diameter, felt line absent. S3-S6 with subequal amounts of decumbent and erect setae, setae shorter than smaller mesotibial spur. Pygidium transverse, margin defined by slightly elevated ridge, posterior margin strongly convex, anterior one-third irregular with dense coarse punctations, pygidial plate entirely with dense fine punctation, except anterolateral margins smooth; hypopygium with posterior margin deeply notched, mesal area with longitudinal depression > 0.5 X length of sternum but sometimes indistinct. Genitalia as in fig. 25.

FEMALE: Unknown.

MATERIAL EXAMINED

TYPE MATERIAL. Holotype: ♂, "[ISRAEL:] Palestine, Revivim [31°02'N 34°44'E], 13-iv-19, H. BYTINSKI-SALZ"; "*Tricholabioides* [*sic*] *semistriata* [*sic*] Kl., det. BYTINSKI-SALZ." (1♂, SUAR). Measured paratypes: 3♂: ISRAEL: [1]Palestine, Netanya, 32°20'N 34°51'E, 17.v.19 (Bytinski-Salz) (1♂, MNCN); Palestine, Rehovot, 31°54'N 34°49'E, 21.v.1947 (Bytinski-Salz) (1♂, TAUI); Palestine, Revivim, 31°02'N 34°44'E, 13.vi.19 (Bytinski-Salz) (1♂, TAUI).

MEASURED MATERIAL. 3♂: ISRAEL: Pardes Hanna, 32°29'N 34°58'E, 16.vi.1969, *det.* by Petersen as *Tricholabiodes pedunculatus palaestinensis* Suár. (1♂, TAUI); Hadassim, 32°17'N 34°53'E, 2.vi.1953, *det.* by Petersen as *Tricholabiodes pedunculatus palaestinensis* Suár. (1♂, TAUI); Abu Kabiv, 32°03'N 34°46'E, 10.xi.1955 (L. Fishelsohn) *det.* by Petersen as *Tricholabiodes pedunculatus palaestinensis* Suár. (1♂, TAUI).

DISTRIBUTION

This species occurs in southwestern Asia with specimens recorded only from Israel (fig. 90).

DISCUSSION

Suárez (1967) originally described this species as a subspecies of *T. pedunculatus*, basing his description on six specimens. Suárez's description is brief, providing only the diagnostic characters for identifying this species. The redescription (Suárez 1990) of *T. pedunculatus palaestinensis* is not only thorough but is accompanied by drawings of the more diagnostic characters. In this present study *T. pedunculatus palaestinensis* is recognized as a separate species, since it displays a distinct unique array of characters.

Tricholabiodes palaestinensis is very similar to *T. pedunculatus* but can easily be separated and readily identified from *T. pedunculatus* by the shape of the head behind the compound eyes and the position of the setae on S3-S6. *Tricholabiodes palaestinensis* has the head with sides behind the compound eyes subparallel and S3-S6 with subequal amounts of flat and erect setae. In *T. pedunculatus*, the sides of the head behind the compound eyes are slightly convergent posteriorly and the setae of S3-S6 decumbent.

***Tricholabiodes chloroticus* (Gribodo, 1884). ♂**

Mutilla pedunculata; Sichel & Radoszkowski, 1869:263, fig. 98 (misidentification). ♂
Mutilla chlorotica Gribodo, 1884:391. ♂
[*Mutilla* (*Tricholabiodes*)] *chlorotica* Grib.[odo]; André, 1896a:267. ♂
[*Mutilla*] *chlorotica* Grib.[odo]; Dalla Torre, 1897:23. ♂
Mut. [*illa*] *chlorotica* Gribodo; André, 1901:175. ♂
T. [*richolabiodes*] *chlorotica* [*sic*] Gribodo; André, 1902:21. ♂
[*Tricholabiodes*] *chlorotica* [*sic*] Grib.[odo].; André, 1909a:123. ♂
[*Tricholabiodes*] *chlorotica* [*sic*] Grib.[odo]; André, 1909b:73. ♂
[*Ephutomma*] *testacea* Klug; Bischoff, 1920:154 (misidentification). ♂
[*Tricholabioides* [*sic*]] *chlorotica* [*sic*] Grib.[odo]; Invrea, 1932b:463. ♂
Tricholabioides [*sic*] *chlorotica* [*sic*] (Grib.[odo]); Invrea, 1965:64. ♂
[*Tricholabioides* [*sic*]] *chlorotica* [*sic*] (Grib.[odo]); Suárez, 1963:924. ♂
Tricholabioides [*sic*] *chlorotica* [*sic*] [(Gribodo)]; Suárez, 1990:131, 181, 186, figs 2(g), 3(j), 4(a), 5(g), 6(e), 7(a), 9, 13. ♂

Since the lectotype of *T. chloroticus* was not studied, only range and mean values for all specimens

studied are included in the following redescription.

DIAGNOSIS

MALE: Body and appendages entirely golden yellow, except for darker mandibular apices and medium yellowish-brown ventral tooth. Head with sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Free border of clypeus strongly convex with a rounded tubercle on each side of midline. Middle and inner mandibular teeth separated by distance subequal to width of apical tooth, inner tooth truncate. Mesepisternum present, mesepisternal groove absent; no mesosternal processes. Mesofemur with greatest width at midlength, posteriorly on basal half with slight elongate protuberance, at midlength shallowly concave. Mesal margin of metacoxa with rounded protuberance, apex slightly sclerotised and upturned, 0.6 X length of coxa; trochanter ventrally swollen; tibia with macrosetae only on anterior and posterior surface, in subequal amounts and increasing in length distally, proximal setae longer than shorter spur, shorter than longer spur, distal setae longer than longer spur, longer spur subsigmoidal; basitarsus with macrosetae only on posterior margin and length subequal to those on tibia, ventral surface aligned with three, possibly four, rows of stout spines. Metasoma with anterior one-third of T2 with longitudinal reticulations, sparsely and finely punctate within each reticulation; anterior one-third of S2 simple, S2 without felt line. S3-S6 with subequal amounts of decumbent and erect setae, setae shorter than smaller mesotibial spur. Posterior margin of hypopygium deeply notched. Genitalia as in fig. 20.

REDESCRIPTION

MALE: Length 13.76-14.35 (mean 14.05) mm. Body and appendages entirely golden yellow, except for darker mandibular apices and medium yellowish-brown ventral tooth; forewing lightly infuscated posterior to pterostigma; entire body covered with long, pallid setae.

Head 1.44-1.51 (mean 1.47) X as wide as long, 0.97-0.99 (mean 0.98) X as wide as mesosoma, 1.60-1.64 (mean 1.62) X as wide as vertex, 1.44-1.46 (mean 1.45) X as long as compound eye, sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with sparse fine punctation, interspaces shiny and wider than puncture diameter; foveola deep; surface between median ocellus and foveola smooth, without longitudinal median groove though slightly longitudinally depressed, between toruli longitudinal median groove v-shape in section and deep; scrobal carina arcuate, extending to scrobal tubercle, posteriorly carina slight; antennal tubercle simple, sparsely and finely punctate. Vertex 0.70-0.78 (mean 0.74) X as long as wide, 1.22-1.28 (mean 1.25) X as wide as frons; posterior to lateral ocellus with sparse fine punctation,

interspaces shiny and wider than puncture diameter. Compound eye with ommatidia distinct. Ocelli large, convex and broadly oval, median ocellus 0.89-0.94 (mean 0.91) X as long as wide, interocellar distance 0.94-1.06 (mean 1.00) X ocellocular distance. Gena with sparse fine punctation, interspaces shiny. Clypeus 0.32-0.33 (mean 0.32) X as high as wide, free border strongly convex with a rounded tubercle on each side of midline; central portion raised and slightly convex, with sparse fine punctation, interspaces 3 X puncture diameter; vestiture length longer than of height of clypeus. Mandible higher than thick, dorsal rim with carina only on proximal half; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth separated by distance subequal to width of apical tooth, inner tooth truncate; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 0.80-1.00 (mean 0.90) X height at base. Antenna with scape 2.20 (mean 2.20) X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere simple; second flagellomere 1.52-1.60 (mean 1.56) X length of first, 1.07-1.12 (mean 1.09) X length of third.

Mesosoma, excluding anterior collar, 1.53-1.68 (mean 1.60) X as long as wide. Pronotum 0.92-0.93 (mean 0.92) X as wide as mesosoma, anterodorsal surface mesally with moderate, fine to medium punctation, becoming pit-like shallow reticulations laterally, strongly convex, humeral angle subrounded; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct, 4-5 X reticulation diameter; posterior portion of lateral surface with moderate medium punctation, interspaces irregular and subequal to puncture diameter, posterior margin impunctate. Mesoscutum 0.79-0.83 (mean 0.81) X as long as wide, 0.79-0.83 (mean 0.81) X as wide as pronotum; between notauli with sparse, fine to medium punctation, interspaces smooth and wider than puncture diameter; laterally with moderate medium punctation, posterolaterally with dense coarse punctation; posterolateral corner raised as an angulate tooth. Scutellum subsquare, entire dorsal surface densely covered with dense coarse punctures. Dorsellum with dense medium punctation, laterally simple, although edges of lateral punctures may give the impression that dorsellum is laterally ridged. Propodeum with areola longer than neighbouring areae. Mesepisternum, anterior to scrobe with moderate to coarse, medium punctation becoming pit-like, shallow reticulations, posterior to scrobe with pit-like shallow reticulations, reticulations approximately same size as those on anterior portion of lateral surface of pronotum, scrobe an indistinct subcircular depression, mesepisternal groove absent. Mesosternum with anterior concavity nearly impunctate, shiny, posteriorly smooth to sparsely punctate, punctures fine and ill-defined; no mesosternal processes.

Forewing: Pterostigma 0.41-0.68 (mean 0.54) X length of anterior margin of marginal cell. Marginal cell 4.42-4.85 (mean 4.64) X as long as wide, 1.49-1.64 (mean 1.57) X length of second submarginal.

Second submarginal cell sessile anteriorly, 0.46-0.54 (mean 0.50) X length of discoidal cell. Third submarginal cell with vein 3r-m nebulous anteriorly becoming spectral posteriorly; medial vein spectral; accessory vein nebulous, 1.15 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur with greatest width at midlength, posteriorly on basal half with slight elongate protuberance, at midlength shallowly concave; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.61-0.70 (mean 0.66) X length of longer spur, longer spur slightly inwardly curved; basitarsus straight. Hind leg: Coxa entirely with sparse punctation, interspaces wider than puncture diameter, mesal margin with rounded protuberance, apex slightly sclerotised and upturned, 0.6 X length of coxa, ventral surface flat; trochanter ventrally swollen; femur with macrosetae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae only on anterior and posterior surface, in subequal amounts and increasing in length distally, proximal setae longer than shorter spur, shorter than longer spur, distal setae longer than longer spur, shorter spur 0.47-0.53 (mean 0.50) X length of longer spur, longer spur subsigmoidal, 0.72-0.77 (mean 0.75) X length of basitarsus; basitarsus with dense microsetae, macrosetae only on posterior margin and length subequal to those on tibia, ventral surface with three, possibly four, rows of stout spines, spines in anterior row half the length of spines in posterior row.

Metasoma 1.09-1.32 (mean 1.21) X as long as wide. First segment moderately narrow and fairly long, slightly constricted at apex, 2.35-2.41 (mean 2.38) X as long as wide, 2.81-3.01 (mean 2.91) X as long as high, 0.96-1.04 (mean 1.00) X as long as T2; tergum, except tergulum, irregular with dense coarse ill-defined punctation, tergulum with moderate fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum with dense coarse punctation, mesal area with carina either present anteriorly, absent posteriorly or entirely absent. T2 0.88-0.98 (mean 0.93) X as long as wide, 1.03-1.08 (mean 1.05) X as wide as mesosoma, vestiture subdecumbent to suberect, anterior one-third with ill-defined longitudinal rectangular reticulations, sparsely and finely punctate within each reticulation, posterior two-thirds shallowly and sparsely punctate, interspaces shiny and wider than puncture diameter, felt line 0.51-0.54 (mean 0.52) X length of tergum, length anterior to felt line 1.19-1.30 (mean 1.25) X length of tergum posterior to felt line; S2 convex, setae evenly distributed and shorter than shorter mesotibial spur, anteriorly with moderate medium punctation, interspaces irregular and subequal to puncture diameter, mesal area without carina, posteriorly with sparse fine punctation, interspaces shiny and wider than puncture diameter, felt line absent. S3-S6 with subequal amounts of decumbent and erect setae, setae shorter than smaller mesotibial spur. Pygidium slightly dorsally convex, margin defined by slightly elevated ridge, posterior margin strongly convex, anterior

one-third irregular and moderately punctate, interspaces subequal to puncture diameter, pygidial plate anterior half smooth although surface slightly irregular, posterior half with dense fine punctation, punctures increasing in density and decreasing in size posteriorly; hypopygium with long dense setae, posterior margin deeply notched, sometimes slightly masked by hairiness but visible if separate tergum and sternum, mesal area simple. Genitalia as in fig. 20.

FEMALE: Unknown.

Lectotype: 1♂, "Yemén merid.; Tes. [= Teshh; 14°55'N 44°14'E] I-1880; R. MANZONI; *Mutilla chlorotica*; Grib.[odo] ♂; *Typus; chlorotica*; Grib.[odo]; *Tricholabioides* [*sic*]; *chlorotica* [*sic*]; (Grib); Det. F. Invrea."

MATERIAL EXAMINED

MEASURED MATERIAL. 2♂: SOUTH YEMEN: [2]Abyan, 50 m, 13°10'N 45°20'E, 21.v.1967 (K. Guichard, B. M. 1967-455) (1♂, NHML); [1]Aden Prot., Waht, ca. 6 mls S. of Lahej, 250 ft (?), 13°01'N 44°54'E, 12.i.1940 (P.W.R. Petrie, Medical Survey, B.M. 1940-107) (1♂, NHML).

ADDITIONAL MATERIAL. 1♂: SOUTH YEMEN: Abyan, 50m, 13°10'N 45°20'E, 21.v.1967 (K. Guichard, B. M. 1967-455) (1♂, NHML).

DISTRIBUTION

This species is distributed in southwestern Asia, with specimens recorded from South Yemen (fig. 91).

DISCUSSION

Although Gribodo's (1884) description, based on two specimens, is brief, it is accurate and detailed enough, providing sufficient characters for the correct identification of *T. chloroticus*. André (1901) repeated Gribodo's (1884) description verbatim. Suárez (1990), in redescribing *T. chloroticus*, designated one of the syntypes as the lectotype. The other syntype ["Yemen merid / Tes [*sic*] I.1880 / R. Manzoni"; "TYPUS"; "*Mutilla / chlorotica* / ♂ Grib. / Tipo [handwritten]"; "*Tricholabiodes / chlorotica* [*sic*] Grib. / E. Zavattari, *det.*"], designated here as the paralectotype, was not studied by Suárez. According to Suárez's (1990) description and key, and by my own investigations, the paralectotype is not conspecific with the lectotype. Furthermore, since the paralectotype is badly damaged (including the genitalia), it is impossible to accurately identify this specimen. Suárez, besides providing detailed drawings of diagnostic characters, including genitalia, included *T. chloroticus* in a

key to some of the Palaearctic species.

Although there have been numerous references to this species, only a few specimens have been collected and studied. André (1896a) included *T. chloroticus* in a species list of *Mutilla* (*Tricholabiodes*), while Dalla Torre (1897) listed this species in a catalogue of described species of *Mutilla*. André (1902), in redescribing *Tricholabiodes*, included *T. chloroticus* in a species list of the genus. Several authors (André 1901, 1909a, 1909b; Invrea 1932b; Suárez 1963) refer to the similarity in coloration between *T. chloroticus* and *T. lividus* (André 1909a, 1909b; Suárez 1963), *T. aegyptiacus* (André 1901), *T. patrizii* (Invrea 1932b; Suárez 1963) and *T. testaceus* (Suárez 1963), stating that these species are almost indistinguishable. Invrea (1965), during a discussion of *T. chloroticus* corrected the synonymy by Bischoff (1920) of *Ephutomma testacea* Klug and *T. chloroticus*.

Since Suárez (1990) redescribed this species in detail, including drawings with the description, it is relatively easy, in the absence of the lectotype, to identify this species using the descriptions (Gribodo 1884; Suárez 1990) and key (Suárez 1990). The measured and additional specimens studied match Suárez's description exactly. The information provided on the lectotype label was transcribed from Suárez's (1990) redescription.

This species is most similar to *T. pedunculatus* and *T. palaestinensis* but can be readily separated from these two species by the protrusion on the mesal margin of the metacoxa, and the shape of the metatrochanter and longer metatibial spur. *Tricholabiodes chloroticus* has a protrusion shaped as a rounded lobule on the mesal margin of the metacoxa, the metatrochanter is bulbous and the longer metatibial spur is subsigmoidal. Both *T. pedunculatus* and *T. palaestinensis* have a triangular protuberance on the mesal margin of the metacoxa, the metatrochanter is small and the longer metatibial spur is straight. The genitalia (figs 20, 24 & 25) are also very distinctive, leaving one in no doubt to the identity of this species.

***Tricholabiodes femoralis* sp. nov. ♂**

DIAGNOSIS

MALE: Metasoma entirely medium yellowish-brown except for narrow pale reddish-brown band at apex of T1. Head with sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Gena with moderate to dense coarse punctation, decreasing in

density and size posteriorly, interspaces shiny. Free border of clypeus strongly convex with a rounded tubercle on each side of midline. Middle and inner mandibular teeth separated by distance subequal to width of apical tooth, inner tooth truncate. Dorsellum with dense fine punctation, laterally simple. Mesepisternum with scrobe present, mesepisternal groove absent; no mesosternal processes. Midfemur with greatest width in basal third, dorsal and ventral surface subparallel, posteriorly on basal half with a slight elongate protuberance. Mesal margin of metacoxa with short triangular protuberance 0.25 X length of coxa; trochanter ventrally swollen; basitarsus with dense microsetae, macrosetae only on posterior surface and shorter than those on tibia. Metasoma with anterior one-third of T2 with longitudinal rectangular reticulations, sparsely and finely punctate within each reticulation; anterior mesal area of S2 with slight carina < 0.3 X length of sternum, S2 without felt line. Pygidium with pygidial plate entirely with dense fine punctation, except anterolateral margin smooth; hypopygium with posterior margin deeply notched. Genitalia as in fig. 21.

DESCRIPTION

MALE: Length 15.55 (10.64-15.55, mean 13.41) mm. Head, including clypeus, pale to medium yellowish-brown; antenna golden yellow to pale yellowish-brown; mandible almost entirely pale yellowish-brown, apex black, ventral tooth pale reddish-black; mesosoma pale to medium yellowish-brown; legs, including coxae and tibial spurs, golden yellow to pale yellowish-brown; forewing darkly infuscated posterior to marginal cell; pterostigma and wing veins pale yellowish-brown; metasoma entirely medium yellowish-brown; entire body covered with long, pallid setae.

Head 1.42 (1.41-1.47, mean 1.43) X as wide as long, 0.96 (0.96-1.05, mean 1.01) X as wide as mesosoma, 1.58 (1.58-1.66, mean 1.61) X as wide as vertex, 1.42 (1.42-1.46, mean 1.43) X as long as compound eye, sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with sparse fine punctation, interspaces shiny and wider than puncture diameter; foveola deep; surface between median ocellus and foveola without longitudinal median groove though slightly longitudinally depressed, between toruli longitudinal median groove v-shape in section and deep; scrobal carina arcuate, not reaching scrobal tubercle; antennal tubercle simple, with sparse fine punctation. Vertex 0.71 (0.69-0.72, mean 0.71) X as long as wide, 1.42 (1.36-1.48, mean 1.41) X as wide as frons; posterior to lateral ocellus with sparse fine punctation, interspaces shiny and wider than puncture diameter. Compound eye with ommatidia distinct. Ocelli large, convex and broadly oval, median ocellus 0.90 (0.74-1.01, mean 0.86) X as long as wide, interocellar distance 0.83 (0.83-1.31, mean 1.05) X ocellocular distance. Gena with moderate to dense, medium punctation, punctures sometimes decreasing in density and size posteriorly, interspaces shiny.

Clypeus 0.36 (0.34-0.44, mean 0.37) X as high as wide, free border strongly convex with a rounded tubercle on each side of midline; central portion raised with slight longitudinal mesal depression, with sparse fine punctation, interspaces 3 X puncture diameter; vestiture length longer than height of clypeus. Mandible higher than thick, dorsal rim with carina along entire length, ending at junction between middle and inner tooth; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth separated by distance subequal to width of apical tooth, inner tooth truncate; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 0.92 (0.83-0.93, mean 0.88) X height at base. Antenna with scape 2.16 (2.04-2.29, mean 2.16) X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere simple; second flagellomere 1.26 (1.26-1.46, mean 1.37) X length of first, 1.04 (1.01-1.04, mean 1.02) X length of third.

Mesosoma, excluding anterior collar, 1.63 (1.62-1.73, mean 1.67) X as long as wide. Pronotum 0.90 (0.86-0.92, mean 0.90) X as wide as mesosoma, anterodorsal surface with dense fine ill-defined punctation mesally, becoming pit-like shallow reticulations laterally, strongly convex, humeral angle subrounded; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct and almost as large as a reticulation; posterior portion of lateral surface with sparse fine punctation, interspaces irregular and wider than puncture diameter, posterior margin impunctate. Mesoscutum 0.78 (0.78-0.84, mean 0.81) X as long as wide, 0.82 (0.80-0.85, mean 0.82) X as wide as pronotum; entirely with moderate medium punctation, interspaces smooth and subequal to puncture diameter, posterolaterally with dense coarse punctation; posterolateral corner raised as an angulate tooth. Scutellum subtrapezoidal, posteriorly convergent, entire dorsal surface moderately to densely covered with medium punctations. Dorsellum with dense fine punctation, laterally simple. Propodeum with areola slightly longer than neighbouring areae. Mesepisternum, anterior to mesepisternal groove with moderate medium punctation becoming pit-like, shallow reticulations, interspaces irregular, posterior to mesepisternal groove with pit-like shallow reticulations, reticulations approximately same size as those on anterior portion of lateral surface of pronotum, scrobe an indistinct subcircular depression, mesepisternal groove present but sometimes indistinct. Mesosternum with anterior concavity nearly impunctate, shiny, posteriorly moderately punctate, punctures medium and ill-defined; no mesosternal processes.

Forewing: Pterostigma 0.34 (0.33-0.40, mean 0.35) X length of anterior margin of marginal cell. Marginal cell 4.68 (4.09-5.41, mean 4.75) X as long as wide, 1.60 (1.58-1.74, mean 1.64) X length of second submarginal. Second submarginal cell sessile anteriorly, 0.48 (0.46-0.49, mean 0.48) X length

of discoidal cell. Third submarginal cell with vein 3r-m tubular anterior to junction with accessory vein, nebulous becoming spectral posterior to junction with accessory vein; medial vein spectral; accessory vein nebulous, 1.30 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur slender with greatest width in basal third, dorsal and ventral surface subparallel, posteriorly on basal half with slight elongate protuberance; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.71 (0.69-0.76, mean 0.72) X length of longer spur, longer spur almost straight; basitarsus straight. Hind leg: Coxa entirely with dense medium punctation, interspaces narrower than puncture diameter, mesal margin with short triangular protuberance 0.25 X length of coxa, apex sclerotised but not acute, ventral surface convex; trochanter slightly ventrally swollen; femur with macrosetae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae sparsely but evenly distributed, shorter than shorter spur, shorter spur 0.67 (0.64-0.77, mean 0.68) X length of longer spur, longer spur almost straight, 0.74 (0.64-0.81, mean 0.76) X length of basitarsus; basitarsus with dense microsetae, macrosetae only on posterior surface and shorter than those on tibia, ventral surface with two, often indistinct, rows of short spines.

Metasoma 1.23 (1.13-1.32, mean 1.23) X as long as wide. First segment moderately narrow and fairly long, slightly constricted at apex, 2.09 (2.00-2.33, mean 2.14) X as long as wide, 2.61 (2.39-2.77, mean 2.60) X as long as high, 0.98 (0.95-1.03, mean 0.97) X as long as T2; tergum, except tergulum, with dense coarse subcircular punctation, tergulum with sparse to moderate, fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum with dense coarse punctation, without any distinct median carina. T2 0.85 (0.85-0.96, mean 0.91) X as long as wide, 1.12 (1.03-1.13, mean 1.09) X as wide as mesosoma, vestiture sparse, anterior one-third with longitudinal rectangular reticulations, sparsely and finely punctate within each reticulation, posterior two-thirds with dense medium punctation, interspaces shiny and narrower than puncture diameter, felt line 0.51 (0.38-0.51, mean 0.42) X length of tergum, length anterior to felt line 0.98 (0.83-1.58, mean 1.17) X length of tergum posterior to felt line; S2 convex, setae evenly distributed and shorter than shorter mesotibial spur, anteriorly with dense, medium to coarse punctation, interspaces irregular and narrower than puncture diameter, mesal area with slight carina, < 0.3 X length of sternum, posteriorly with moderate medium punctation, interspaces shiny and subequal to puncture diameter, felt line absent. Pygidium slightly dorsally convex, posterior margin strongly convex, anterior one-third irregular and moderately punctate, interspaces subequal to puncture diameter, pygidial plate entirely with dense fine punctation, except anterolateral margin smooth; hypopygium with posterior margin deeply notched, mesal area simple. Genitalia as in fig. 21.

FEMALE: Unknown.

MATERIAL EXAMINED

TYPE MATERIAL. Holotype: ♂, "Nakhali [25°15'08"N 55°16'48"E] Dubai / United Arab Emirates / x.1984 / E.A. Sugden"; "light trap" (UCDC).

Measured paratypes: 4♂: UNITED ARAB EMIRATES: [1]Nakhali, 25°15'08"N 55°16'48"E, vii.1984 (1♂), [2]ix.1984 (1♂), [3]x.1984 (1♂) (E.A. Sugden) light trap (3♂, UCDC); OMAN: [4]57 km S. of Hafit, 23°28'N 55°53'E, 31.iii-7.iv.1994 (M.D. Gallagher & B. Tigar, #8590) to light, dune on gravel plain (1♂, DJBC).

Additional paratypes: 10♂: UNITED ARAB EMIRATES: Nakhali, 25°15'08"N 55°16'48"E, vii.1984 (2♂), ix.1984 (6♂), x.1984 (1♂) (E.A. Sugden) light trap (9♂, UCDC); OMAN: Wadi Aswad, 150 m, 22°27'N 56°12'E, 27.iii.1994 (M.D. Gallagher, #8582) to light (1♂, DJBC).

DISTRIBUTION

This species occurs in southwestern Asia, with specimens recorded from the United Arab Emirates and Oman (fig. 91).

DISCUSSION

Tricholabiodes femoralis is most similar to *T. protuberans*, with both species having very similar genitalia (figs 21 & 26). These two species can be readily identified from each other by the posterior shape of the head. In *T. femoralis*, the sides of the head behind the compound eyes are slightly convergent posteriorly, unlike *T. protuberans*, where the sides of the head behind the compound eyes are subparallel. These species can also be separated on colour. *Tricholabiodes protuberans* has T2-T6 dark reddish-black, while *T. femoralis* has the metasoma entirely medium yellowish-brown.

ETYMOLOGY

"*femoralis*" (L.), femur; in reference to the mesofemur which is slightly swollen basally.

Tricholabiodes trochantalis sp. nov. ♂

DIAGNOSIS

MALE: Metasoma with T1 entirely pale reddish-brown, T2-T6 dark reddish-brown to black, becoming slightly paler posteriorly, sterna paler than corresponding terga. Head with sides behind compound eyes

slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Free border of clypeus strongly convex with a rounded tubercle on each side of midline. Middle and inner mandibular teeth separated by distance subequal to width of apical tooth, inner tooth truncate. Mesepisternum with scrobe present, mesepisternal groove absent. Mesosternum simple, no mesosternal processes. Mid leg with femur with greatest width in basal third, dorsal and ventral surface subparallel, posteriorly on basal half with a slight elongate protuberance, at midlength sometimes slightly concave. Mesal margin of metacoxa with a short triangular protuberance 0.25 X length of coxa, trochanter slightly swollen ventrally. Metasoma with anterior one-third of T2 with longitudinal rectangular reticulations, often vaguely resembling slight costulations, sparsely and finely punctate within each reticulation; centrally on S2 with setae clumped and longer than shorter mesotibial spur, S2 without felt line. S3-S6 with subequal amounts of decumbent and erect setae, setae shorter than smaller mesotibial spur. Posterior margin of hypopygium deeply notched, mesal area with longitudinal depression > 0.5 X length of sternum. Genitalia as in fig 23.

DESCRIPTION

MALE: Length 13.88 (13.88-17.05, mean 15.38) mm. Head, including clypeus, medium yellowish-brown, clypeus golden yellow; mandible almost entirely pale yellowish-brown, apex black, ventral tooth pale reddish-black; mesosoma pale reddish-brown; legs, including coxae and tibial spurs, pale yellowish-brown; forewing infuscated posterior to marginal cell; pterostigma and wing veins pale yellowish-brown; metasoma with T1 entirely pale reddish-brown, T2-T6 dark reddish-black to black, becoming slightly paler posteriorly, sterna paler than corresponding terga; entire body covered with long, pallid setae.

Head 1.54 (1.42-1.58, mean 1.51) X as wide as long, 0.90 (0.88-0.91, mean 0.90) X as wide as mesosoma, 1.56 (1.53-1.58, mean 1.55) X as wide as vertex, 1.40 (1.36-1.53, mean 1.44) X as long as compound eye, sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with sparse fine punctation, interspaces shiny and wider than puncture diameter; foveola deep; surface between median ocellus and foveola smooth, without longitudinal median groove though slightly longitudinally depressed, between toruli longitudinal median groove v-shape in section and deep; scrobal carina arcuate, not reaching scrobal tubercle; antennal tubercle simple, with sparse fine punctation. Vertex 0.71 (0.71-0.76, mean 0.73) X as long as wide, 1.46 (1.36-1.46, mean 1.42) X as wide as frons; posterior to lateral ocellus with moderate fine punctation, interspaces shiny and subequal to puncture diameter. Compound eye with ommatidia distinct. Ocelli large, convex and broadly oval, median ocellus 0.81 (0.76-0.89, mean 0.82) X as long as wide,

interocellar distance 1.27 (0.97-1.36, mean 1.22) X ocellocular distance. Gena with sparse to moderate, medium punctation, interspaces irregular. Clypeus 0.36 (0.34-0.38, mean 0.36) X as high as wide, free border strongly convex with a rounded tubercle on each side of midline; central portion raised and slightly convex, with sparse fine punctation, interspaces 2 X puncture diameter; vestiture length longer than height of clypeus. Mandible higher than thick, dorsal rim with carina along entire length, ending at base of inner tooth; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth separated by distance subequal to width of apical tooth, inner tooth truncate; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 1.10 (0.88-1.20, mean 1.04) X height at base. Antenna with scape 2.16 (2.04-2.37, mean 2.20) X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere simple; second flagellomere 1.43 (1.35-1.46, mean 1.41) X length of first, 1.08 (0.99-1.08, mean 1.03) X length of third.

Mesosoma, excluding anterior collar, 1.53 (1.47-1.63, mean 1.54) X as long as wide. Pronotum 0.90 (0.89-0.90, mean 0.89) X as wide as mesosoma, anterodorsal surface with moderate medium punctation mesally becoming pit-like shallow reticulations laterally, slightly convex, humeral angle subrounded; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct and almost as large as a reticulation; posterior portion of lateral surface rough striated with sparse fine punctation, interspaces wider than puncture diameter, posterior margin impunctate. Mesoscutum 0.86 (0.84-0.86, mean 0.86) X as long as wide, 0.82 (0.81-0.86, mean 0.83) X as wide as pronotum; between notauli with sparse to moderate, medium punctation, interspaces smooth; laterally with sparse to moderate, fine punctation, posterolaterally with dense coarse punctation; posterolateral corner raised as an angulate tooth. Scutellum subsquare, entire dorsal surface densely covered with coarse subcircular punctations. Dorsellum with dense medium punctation, laterally simple. Propodeum with areola slightly longer than neighbouring areae. Mesepisternum, anterior to scrobe with sparse medium punctation, punctures increasing in density and size posteriorly, posterior to scrobe with pit-like, shallow reticulations, reticulations approximately same size as those on anterior portion of lateral surface of pronotum, scrobe a distinct subcircular depression, mesepisternal groove absent. Mesosternum with anterior concavity nearly impunctate, shiny, posteriorly moderately punctate, punctures medium and ill-defined; no mesosternal processes.

Forewing: Pterostigma 0.39 (0.29-0.39, mean 0.35) X length of anterior margin of marginal cell. Marginal cell 4.04 (3.95-4.37, mean 4.09) X as long as wide, 1.57 (1.47-1.65, mean 1.58) X length of second submarginal. Second submarginal cell sessile anteriorly, 0.47 (0.43-0.49, mean 0.46) X length

of discoidal cell. Third submarginal cell with vein 3r-m tubular anterior to junction with accessory vein, nebulous becoming spectral posterior to junction with accessory vein; medial vein spectral; accessory vein nebulous, 1.2 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur with greatest width in basal third, dorsal and ventral surface subparallel, posteriorly on basal half with a slight elongate protuberance, at midlength sometimes slightly concave; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.75 (0.70-0.75, mean 0.72) X length of longer spur, longer spur almost straight; basitarsus straight. Hind leg: Coxa entirely with sparse punctation, interspaces wider than puncture diameter, mesal margin with short triangular protuberance 0.25 X length of coxa, ventral surface convex; trochanter slightly swollen ventrally; femur with macrosetae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae sparsely but evenly distributed, shorter than shorter spur, shorter spur 0.65 (0.60-0.68, mean 0.64) X length of longer spur, longer spur almost straight, 0.77 (0.77-0.80, mean 0.78) X length of basitarsus; basitarsus with dense microsetae, several macrosetae on posterior surface, ventral surface with two of short stout spines.

Metasoma 1.20 (1.11-1.29, mean 1.20) X as long as wide. First segment fairly long, slightly constricted at apex, 1.95 (1.95-2.10, mean 2.02) X as long as wide, 2.47 (2.47-2.84, mean 2.71) X as long as high, 0.93 (0.86-0.98, mean 0.92) X as long as T2; tergum, except tergulum, with dense coarse subcircular punctation, tergulum with moderate fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum with dense coarse punctation, median carina absent. T2 0.90 (0.90-0.95, mean 0.93) X as long as wide, 0.98 (0.97-1.11, mean 1.02) X as wide as mesosoma, vestiture subdecumbent to suberect, anterior one-third with longitudinal rectangular reticulations, often vaguely resembling slight costulations, sparsely and finely punctate within each reticulation, posterior two-thirds with moderate medium punctation, interspaces shiny, felt line 0.56 (0.48-0.56, mean 0.53) X length of tergum, length anterior to felt line 1.00 (1.00-1.31, mean 1.19) X length of tergum posterior to felt line; S2 convex, setae evenly distributed and shorter than shorter mesotibial spur, anteriorly with dense coarse punctation, interspaces irregular and narrower than puncture diameter, mesal area simple, posteriorly with moderate medium punctation, interspaces shiny and subequal to puncture diameter, felt line absent. S3-S6 with subequal amounts of decumbent and erect setae, setae shorter than smaller mesotibial spur. Pygidium slightly convex, transverse, posterior margin strongly convex, anterior one-third irregular with dense coarse punctations, pygidial plate anteriorly smooth becoming densely punctate posteriorly, punctures decreasing in size posteriorly; hypopygium with posterior margin deeply notched, mesal area with longitudinal depression > 0.5 X

length of sternum. Genitalia as in fig. 23.

FEMALE: Unknown.

MATERIAL EXAMINED

TYPE MATERIAL. Holotype: ♂, "Oman. Northern region / 2218N 5852E 340m / Wahibia Sands / M D Gallagher & B Skule / MDG 8545" (ZMHB).

Measured paratypes: 9♂: UNITED ARAB EMIRATES: Dubai, Nakhali, 25°06'N 55°34`E, 23.iv.1984 (E.A. Sugden), malaise trap (1♂, UCDC), 25.iv.1984 (E.A. Sugden) malaise trap, (2♂, UCDC), vii.1984 (E.A. Sugden) black light trap (1♂, UCDC), ix.1984 (E.A. Sugden) light trap (2♂, UCDC), I-ii.1985 (E.A. Sugden) (1♂, UCDC). OMAN: Northern region, Wahibia Sands, 340 m, 22°18'N 58°52'E, (M.D. Gallagher & B. Skule, MDG 8545) (1♂, DJBC); Wahibia Sands, 21°39'N 59°18'S, 4-5.x.1994 (M.D. Gallagher & G. Lovre, # 8619) to light (1♂, DJBC).

DISTRIBUTION

This species occurs in southwestern Asia with specimens recorded from United Arab Emirates and Oman (fig. 91).

DISCUSSION

This species is most similar to *T. sudanensis* but can be separated by the following characters: sculpturing on the mesal margin of the metacoxa and the position and length of the setae on S2. In *T. trochantalis*, the mesal margin of the metacoxa has a short triangular protuberance 0.25 X length of the coxa and S2 has the macrosetae evenly spaced and shorter than the shorter mesotibial spur. In *T. sudanensis*, the mesal margin of the metacoxa has a short blunt protuberance, varying in length from 0.25-0.50 X length of the coxa and the mesal area of S2 has long fairly thick setae which are denser medially than laterally.

ETYMOLOGY

"*trochantalis*" (L.), trochanter; in reference to the metatrochanter which is slightly swollen.

***Tricholabiodes nonveilleri* Suárez, 1977. ♂**

Tricholabioides [*sic*] *nonveilleri* Suárez, 1977:214, 216, 219, figs. 1-5. ♂

Tricholabioides [*sic*] *nonveilleri* Suárez; Suárez, 1990:149, 181, 186, figs. 1(b), 3(f), 4(p), 5(f), 17.

♂

DIAGNOSIS

MALE: Metasoma with T1 entirely yellowish-brown, T2-T6 dark reddish-brown, becoming paler posteriorly, sterna paler than corresponding terga. Free border of clypeus strongly convex with a rounded tubercle on each side of midline. Middle and inner mandibular teeth separated by distance subequal to width of apical tooth, inner tooth subrounded. Mesepisternum with scrobe and, mesepisternal groove present; no mesosternal processes. Mesobasitarsus with anterior and posterior surfaces concave. Mesal margin of metacoxa posteriorly with large dentiform flange. Metasoma with S1 with continuous median carina; anterior one-third of T2 with moderate medium punctation; sternum longitudinally concave centrally, anterior mesal area with slight carina, < 0.5 X length of sternum, S2 without felt line, posterior margin with mesal setae tufted. Hypopygium with posterior margin convex, mesal area with longitudinal depression < 0.5 X length of sternum. Genitalia as in fig. 42.

REDESCRIPTION

MALE: Length 12.12 (9.22-13.22, mean 10.98) mm. Head, including clypeus and antenna, medium yellowish-brown; mandible almost entirely pale yellowish-brown, apex black, ventral tooth medium reddish-black; mesosoma medium yellowish-brown; legs, including coxae and tibial spurs, pale yellowish-brown; forewing lightly infuscated posterior to pterostigma; pterostigma and wing veins pale yellowish-brown; metasoma with T1 entirely yellowish-brown, T2-T6 dark reddish-brown, becoming paler posteriorly, sterna paler than corresponding terga.

Head 1.40 (1.37-1.40, mean 1.39) X as wide as long, 0.95 (0.91-0.98, mean 0.94) X as wide as mesosoma, 1.54 (1.50-1.61, mean 1.55) X as wide as vertex, 1.57 (1.50-1.58, mean 1.54) X as long as compound eye, sides behind compound eyes subparallel, distinct from weakly convex posterior margin. Frons with sparse fine punctation, interspaces shiny and wider than puncture diameter; foveola deep; surface between median ocellus and foveola without longitudinal median groove though slightly longitudinally depressed, between toruli longitudinal median groove v-shape in section and deep; scrobal carina absent; antennal tubercle simple, with sparse fine punctation. Vertex 0.74 (0.72-0.77, mean 0.74) X as long as wide, 1.32 (1.31-1.36, mean 1.34) X as wide as frons; posterior to lateral ocellus with sparse fine punctation, interspaces shiny and wider than puncture diameter. Compound eye with ommatidia distinct. Ocelli large, convex and broadly oval, median ocellus 0.82 (0.77-0.89, mean 0.82) X as long as wide, interocellar distance 1.12 (1.09-1.23, mean 1.14) X ocellocular distance. Gena with

moderate medium punctation, interspaces irregular. Clypeus 0.37 (0.35-0.39, mean 0.37) X as high as wide, free border strongly convex with a rounded robust tubercle on each side of midline; central portion raised and slightly convex, mesal area between the tubercles slightly longitudinally depressed, sparsely and finely punctate, interspaces 3 X puncture diameter; vestiture length longer than height of clypeus, inconspicuous. Mandible higher than thick, dorsal rim with carina along entire length, ending at base of middle tooth; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth separated by distance subequal to width of apical tooth, inner tooth subrounded; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 0.85 (0.79-0.98, mean 0.85) X height at base. Antenna with scape 2.05 (1.85-2.20, mean 2.02) X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere simple; second flagellomere 1.38 (1.29-1.48, mean 1.35) X length of first, 1.04 (0.96-1.04, mean 1.00) X length of third.

Mesosoma, excluding anterior collar, 1.77 (1.64-1.74, mean 1.70) X as long as wide. Pronotum 0.91 (0.90-0.91, mean 0.91) X as wide as mesosoma, anterodorsal surface with moderate fine punctation mesally becoming pit-like shallow reticulations laterally, slightly convex, humeral angle subrounded; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct and almost as large as a reticulation; posterior portion of lateral surface with sparse fine punctation, interspaces irregular and wider than puncture diameter, posterior margin rough striated. Mesoscutum 0.79 (0.75-0.82, mean 0.79) X as long as wide, 0.85 (0.81-0.87, mean 0.83) X as wide as pronotum; between notauli with moderate medium punctation, interspaces smooth and subequal to puncture diameter; laterally with sparse medium punctation, posterolaterally with dense coarse punctation; posterolateral corner raised as an angulate tooth. Scutellum subsquare, entire dorsal surface densely covered with coarse subcircular punctation. Dorsellum with dense fine punctation, laterally ridged. Propodeum with areola subtriangular, longer than neighbouring areae. Mesepisternum with pit-like, shallow reticulations, reticulations approximately same size as those on anterior portion of lateral surface of pronotum, scrobe an indistinct subcircular depression, mesepisternal groove present. Mesosternum with anterior concavity nearly impunctate, shiny, posteriorly with sparse fine punctation; no mesosternal processes.

Forewing: Pterostigma 0.30 (0.36-0.48, mean 0.41) X length of anterior margin of marginal cell. Marginal cell 4.04 (3.80-4.58, mean 4.00) X as long as wide, 1.70 (1.49-1.73, mean 1.58) X length of second submarginal. Second submarginal cell sessile anteriorly, 0.48 (0.46-0.50, mean 0.49) X length of discoidal cell. Third submarginal cell with vein 3r-m tubular anterior to junction with accessory vein, nebulous becoming spectral or entirely absent posterior to junction with accessory vein; medial vein

spectral or absent; accessory vein nebulous, 1.1 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur simple with greatest width at midlength; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.76 (0.53-0.76, mean 0.64) X length of longer spur, longer spur almost straight; basitarsus with anterior and posterior surfaces concave. Hind leg: Coxa entirely with moderate punctation, interspaces wider than puncture diameter, mesal margin with large dentiform flange posteriorly, ventral surface flat; trochanter simple; femur with macrosetae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae sparsely but evenly distributed, shorter than shorter spur, shorter spur 0.66 (0.65-0.75, mean 0.69) X length of longer spur, longer spur almost straight, 0.73 (0.67-0.81, mean 0.72) X length of basitarsus; basitarsus with dense microsetae, macrosetae only on posterior margin and shorter than those on tibia.

Metasoma 1.25 (1.02-1.35, mean 1.21) X as long as wide. First segment moderately narrow and fairly long, slightly constricted at apex, 2.29 (2.20-2.54, mean 2.40) X as long as wide, 2.55 (2.42-2.63, mean 2.55) X as long as high, 1.03 (0.98-1.11, mean 1.04) X as long as T2; tergum, except tergulum, with dense coarse subcircular punctation, tergulum with moderate fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum with sparse medium punctation anteriorly, with dense medium punctation posteriorly, median carina continuous. T2 0.96 (0.94-1.05, mean 1.00) X as long as wide, 1.07 (0.98-1.02, mean 1.00) X as wide as mesosoma, vestiture subdecumbent to suberect, anterior one-third with moderate medium punctation, posterior two-thirds with sparse fine punctation, interspaces shiny and subequal to puncture diameter, felt line 0.52 (0.45-0.54, mean 0.50) X length of tergum, length anterior to felt line 1.13 (1.08-1.55, mean 1.30) X length of tergum posterior to felt line; sternum with mesal longitudinal concavity, setae evenly distributed and shorter than shorter mesotibial spur, anteriorly with dense coarse punctation, interspaces irregular and narrower than puncture diameter, mesal area with slight carina, < 0.5 X length of sternum, posteriorly with moderate medium punctation, interspaces shiny and subequal to puncture diameter, felt line absent, posterior margin with mesal setae tufted but sometimes indistinct. Pygidium transverse, posterior margin strongly convex, anterior one-third irregular and moderately punctate, interspaces subequal to puncture diameter, pygidial plate anteriorly smooth although surface slightly irregular, posteriorly densely and finely punctate; hypopygium with posterior margin convex, mesal area with longitudinal depression < 0.5 X length of sternum. Genitalia as in fig. 42.

FEMALE: Unknown.

MATERIAL EXAMINED

TYPE MATERIAL. Holotype: ♂, "Mora [11°03'N 14°09'E] Cam[eroon] / guétalé / Nonv[ei]l[ler] -1- [19]70" (NONV).

Measured paratype: 2♂: CAMEROON: [1, 2]Mora, Guétalé, 10°04'N 14°30'E, ii.1968 (Nonveiller) (2♂, MNCN).

MEASURED MATERIAL. 3♂: SENEGAL: [2]Gillon, Fété-Olé, Ferlo, 16°08'N 13°59'W, 23.ix.1971 (B10 H) *det.* by Nonveiller as *Tricholab. nonveilleri* Suárez (1♂, NONV); [1]Bandia, 14°36'N 17°03'W, 27.iii.1980 (Sigwalt) (1♂, MNHN); [3]Sine-Saloum, Fathala, 14°27'N 15°00'W, 13.iii.1981 (R. Sigwalt) (1♂, MNHN); nr Koumpentoum, 14°00'N 14°32'W, iv.1976 (G. Couturier) (1♂, UCDC).

DISTRIBUTION

This species occurs in the westernmost and central west Africa, with specimens recorded from Senegal and Cameroon (fig. 92).

DISCUSSION

Tricholabiodes nonveilleri is a distinct species and is unlikely to be misidentified as any of the other species. In this species the mesobasitarsus has the anterior and posterior surfaces concave, the mesal margin of the metacoxa has a large dentiform flange posteriorly, and the mesal area of S2 has a longitudinal concavity with setae on the posterior margin tufted. The genitalia (fig. 42) are extremely distinctive with parameres robust and tapering towards the apex.

Tricholabiodes brothersi sp. nov. ♂

DIAGNOSIS

MALE: Metasoma with T1 entirely medium yellowish-brown, T2-T6 dark-reddish brown, becoming dark yellowish-brown posteriorly, sterna paler than corresponding terga. Clypeus with free border slightly convex with a trianguloid tubercle on each side of midline, below tubercle with declivity bordered laterally by a carina. Mandible dorso-ventrally dilated, laterally on superior basal half with dense ovate pubescent patch, at midlength with strong vertical carina, dorsal rim with carina along basal half strong, continuous with vertical carina, carina along apical half not as strongly sclerotised as carina on basal half, middle and inner mandibular teeth with apices separated by distance subequal to half width of apical tooth, inner tooth subrounded. Mesosoma with no mesosternal processes. Medial margin

of mesocoxa with short triangular protuberance 0.25 X length of coxa, ventral outer lateral surface with slight carina; longer tibial spur slender and slightly inwardly curved. Mesal margin of metacoxa with acute triangular protuberance about 0.5 X length of coxa. Metasoma with continuous median carina on S1 anteriorly triangulate; anterior one-third of T2 with moderate coarse punctation, interspaces shiny and wider than puncture diameter, S2 without felt line. Pygidium posterior margin square, pygidial plate with dense diagonal punctiostriatus; mesal area of hypopygium with median oval depression. Genitalia as in fig. 27.

DESCRIPTION

MALE: Length 17.02 (15.78-17.27, mean 16.51) mm. Head, including clypeus, medium yellowish-brown, antenna golden yellow; mandible almost entirely pale to medium yellowish-brown, apex black, ventral tooth pale reddish-black; mesosoma medium to dark yellowish-brown; legs, including coxae and tibial spurs, golden yellow; forewing lightly infuscated posterior to marginal cell; pterostigma and wing veins golden yellow; metasoma with T1 entirely medium yellowish-brown, T2-T6 dark reddish-brown, becoming dark yellowish-brown posteriorly, sterna paler than corresponding terga.

Head 1.55 (1.55-1.59, mean 1.56) X as wide as long, 0.90 (0.89-0.93, mean 0.91) X as wide as mesosoma, 1.61 (1.58-1.66, mean 1.61) X as wide as vertex, 1.34 (1.31-1.37, mean 1.33) X as long as compound eye, sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with dense medium punctation, interspaces shiny and narrower than puncture diameter; foveola deep; surface between median ocellus and foveola with longitudinal median groove, sides subparallel, between toruli longitudinal median groove v-shape in section and deep; scrobal carina slight; antennal tubercle simple, with sparse fine punctation. Vertex 0.73 (0.67-0.73, mean 0.69) X as long as wide, 1.31 (1.31-1.50, mean 1.39) X as wide as frons; posterior to lateral ocellus with moderate to dense, medium punctation, interspaces shiny and narrower than puncture diameter. Compound eye with ommatidia distinct. Ocelli small, convex and round, median ocellus 0.87 (0.86-0.93, mean 0.90) X as long as wide, interocellar distance 0.67 (0.67-1.56, mean 1.17) X ocellocular distance. Gena with dense medium punctation, sometimes becoming moderately punctate posteriorly, interspaces shiny. Clypeus 0.34 (0.31-0.39, mean 0.35) X as high as wide, free border slightly convex with a trianguloid tubercle each side of midline, below tubercle with declivity bordered laterally by a carina; central portion raised and slightly convex, with dense medium punctation, interspaces narrower than puncture diameter; vestiture length longer than height of clypeus. Mandible dorso-ventrally dilated, laterally on superior basal half with dense ovate pubescent patch, at midlength with strong vertical carina, dorsal rim with carina along basal half strong, continuous with vertical

carina, carina along apical half not as strongly sclerotised as carina on basal half, ending at base of inner tooth; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth with apices separated by distance subequal to half width of apical tooth, inner tooth subrounded; mesal margin smooth; ventral margin deeply excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 0.81 (0.81-0.93, mean 0.86) X height at base. Antenna with scape 1.88 (1.88-2.19, mean 2.05) X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere simple; second flagellomere 1.24 (1.24-1.39, mean 1.33) X length of first, 1.00 (1.00-1.11, mean 1.06) X length of third.

Mesosoma, excluding anterior collar, 1.55 (1.53-1.60, mean 1.56) X as long as wide. Pronotum 0.90 (0.87-0.90, mean 0.89) X as wide as mesosoma, anterodorsal surface with dense fine punctation mesally becoming small pit-like shallow reticulations laterally, strongly convex, humeral angle subrounded; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct and almost as large as a reticulation; posterior portion of lateral surface roughly striated, posterior margin impunctate. Mesoscutum 0.83 (0.83-0.87, mean 0.85) X as long as wide, 0.85(0.81-0.85, mean 0.84) X as wide as pronotum; between notauli with dense medium punctation, interspaces smooth and narrower than puncture diameter; laterally with moderate medium punctation, punctures decreasing in density and size posteriorly, posterolaterally with dense, medium to coarse punctation; posterolateral corner raised as an angulate tooth. Scutellum subtrapezoidal, posteriorly convergent, entire dorsal surface densely covered with coarse subcircular punctation. Dorsellum with dense medium punctation, laterally simple, although edges of lateral punctures may give the impression that dorsellum is laterally ridged. Propodeum with areola longer than neighbouring areae. Mesepisternum, anterior to scrobe with moderate medium punctation becoming pit-like, shallow reticulations posteriorly, posterior to scrobe with shallow pit-like reticulations, reticulations approximately same size as those on anterior portion of lateral surface of pronotum, scrobe a distinct subrectangular depression, mesepisternal groove present, reticulations in groove twice as long as wide. Mesosternum with anterior concavity transversely ridged, posteriorly becoming moderately punctate, punctures fine to medium and ill-defined; no mesosternal processes.

Forewing: Pterostigma 0.52 (0.45-0.52, mean 0.49) X length of anterior margin of marginal cell. Marginal cell 4.72 (3.87-4.72, mean 4.19) X as long as wide, 1.65 (1.61-1.77, mean 1.68) X length of second submarginal. Second submarginal cell sessile anteriorly, 0.47 (0.40-0.47, mean 0.45) X length of discoidal cell. Third submarginal cell with vein 3r-m tubular anterior to junction with accessory vein, nebulous becoming spectral posterior to junction with accessory vein; medial vein basally nebulous,

apically spectral; accessory vein nebulous, 1.20 X longer than marginal cell.

Legs. Mid leg: Coxa with slight carina ventrally on outer lateral surface, mesal margin anteriorly with short triangular protuberance 0.25 X length of coxa; femur simple with greatest width at midlength; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.79 (0.79-0.90, mean 0.83) X length of longer spur, longer spur slender and slightly inwardly curved; basitarsus straight. Hind leg: Coxa entirely with moderate medium punctation, interspaces subequal to puncture diameter, mesal margin with acute triangular protuberance 0.5 X length of coxa, ventral surface convex; trochanter simple; femur with macrosetae longest at midlength, longer than longer tibial spur; tibial macrosetae only on anterior and posterior surface, twice as dense posteriorly, same length as shorter spur, shorter spur 0.72 (0.72-0.82, mean 0.76) X length of longer spur, longer spur almost straight, 0.67 (0.63-0.69, mean 0.66) X length of basitarsus; basitarsus with dense microsetae, macrosetae only on posterior margin and length subequal to those on tibia, ventral surface with spines absent.

Metasoma 1.23 (1.22-1.35, mean 1.27) X as long as wide. First segment moderately narrow and fairly short, slightly constricted at apex, 2.28 (2.09-2.31, mean 2.22) X as long as wide, 2.75 (2.52-2.80, mean 2.67) X as long as high, 0.91 (0.86-0.91, mean 0.90) X as long as T2; tergum, except tergulum, with dense coarse subcircular punctation, tergulum with dense fine punctation anteriorly, interspaces shiny and narrower than puncture diameter, smooth and shiny posteriorly; sternum with dense medium to coarse punctation, median carina slight, anteriorly triangulate. T2 1.03 (1.02-1.05, mean 1.03) X as long as wide, 1.00 (0.98-1.05, mean 1.01) X as wide as mesosoma, vestiture subdecumbent to suberect, anterior one-third with moderate coarse punctation, interspaces shiny and subequal to puncture diameter, posterior two-thirds shallowly and sparsely punctate, interspaces shiny and wider than puncture diameter, felt line 0.34 (0.28-0.34, mean 0.31) X length of tergum, length anterior to felt line 0.94 (0.88-1.02, mean 0.93) X length of tergum posterior to felt line; sternum deeply concave centrally, setae evenly distributed and shorter than shorter mesotibial spur, anteriorly with moderate to dense and medium to coarse punctation, interspaces shiny and narrower than puncture diameter, mesal area with carina anteriorly slightly bulbous, posteriorly slight, posteriorly with moderate medium punctation, punctures decreasing in density and size posteriorly, interspaces shiny and subequal to puncture diameter, felt line absent. Pygidium transverse, posterior margin subsquare, anterior one-third reticulate, pygidial plate with dense diagonal punctostriatus; hypopygium with posterior margin convex, mesal area simple. Genitalia as in fig. 27.

FEMALE: Unknown.

MATERIAL EXAMINED

TYPE MATERIAL. Holotype: ♂, "Bidayar al Ashkhar [25°14'N 55°17'E] / dunes Dubai U[nited] A[rab] E[mirates] / iv 20 1989 / E A Sugden" ; "light / trap" (UCDC).

Measured paratypes: 3♂: IRAQ: [1]Ranya, 36°15'N 44°54'E, 23.v.1936 (H. St.J B. Philby, B. M. 1936-521) (1♂, NHML). UNITED ARAB EMIRATES: [2]Dubai, Bidayar al Ashkhar, dunes, 25°14'N 55°17'E, 20.iv.1984 (E.A. Sugden) (1♂, UCDC). OMAN: [3]Hafit, 57km south, 23°28'N 55°53'E, 31.iii-7.iv.1994 (M.D. Gallagher & B. Tiger, #8590) to light, dune on gravel plain (1♂, DJBC).

Additional paratypes: 3♂: IRAQ: Ranya, 36°15'N 44°54'E, 23.v.1936 (H. St.J B. Philby, B. M. 1936-521) (1♂, NHML). UNITED ARAB EMIRATES: Dubai, Bidayar al Ashkhar, dunes, 25°14'N 55°17'E, 20.iv.1984 (E.A. Sugden) (2♂, UCDC).

DISTRIBUTION

This species is distributed in southwestern Asia, with specimens recorded from Iraq, United Arab Emirates and Oman (fig. 92).

DISCUSSION

Suárez (1990) incorrectly labelled a drawing of the genitalia of this species as *T. bactrianus* (refer to the discussion, following the redescription of *T. bactrianus*).

This species is most similar to *T. mandibularis*. These two species can be separated by the posterior shape of the head, the dorsal rim of the mandibles and the shape of the free border of the clypeus. In *T. brothersi*, the posterior sides of the head behind the compound eyes are slightly convergent posteriorly and gradually merging with the weakly convex posterior margin, the mandibles have the dorsal rim with the carina along the basal half strong and continuous with the vertical carina, the carina along the apical half is not as strongly sclerotised as the carina on the basal half, and the free border of the clypeus is slightly convex with a trianguloid tubercle on each side of the midline. Below the two trianguloid tubercles there is a declivity bordered laterally by a carina. In *T. mandibularis*, the head with sides behind the compound eyes is subparallel, the mandible has the dorsal rim with an enlarged vertical subtriangular flange and the free border of the clypeus is straight to slightly concave.

ETYMOLOGY

"*brothersi*" (L.); it is in deep appreciation of his time, patience and understanding that I name this species after Professor Denis J. Brothers.

***Tricholabiodes mandibularis* Lelej, 1985. ♂**

Tricholabiodes mandibularis Lelej, 1985:149, 150. ♂

[*Tricholabioides* [*sic*]] *mandibularis* Lelej; Suárez, 1990:186. ♂

Since the holotype of *T. mandibularis* was not studied, only range and mean values for all specimens studied are included in the following redescription.

DIAGNOSIS

MALE: Metasoma with T1 entirely medium yellowish-brown, except posterior portion of dorsal surface dark yellowish-brown, T2-T6 dark reddish-brown, becoming dark yellowish-brown posteriorly, sterna paler than corresponding terga. Head with sides behind compound eyes subparallel, distinct from weakly convex posterior margin. Mandible dorsal rim with an enlarged vertical subtriangular flange ending at junction between middle and inner tooth, greatest height of flange above ventral tooth with apex subrounded. Free border of clypeus straight to slightly concave, vestiture length 2-3 X longer than height of clypeus, densely clumped on central raised portion. Mesofemur with greatest width in basal third, dorsal and ventral surface subparallel, shallowly concave anteriorly on basal half, slightly flattened posteriorly, often with a slight carina ventrally; tibia shallowly flattened anteriorly and posteriorly on distal half with slight carina ventrally, in cross-section subtriangular. Mesal margin of metacoxa with slight arched protruding ridge, < 0.5 X length of coxa; femur and tibia with macrosetae dense, longer than shorter tibial spur but shorter than longer tibial spur. Metasoma with anterior one third of T2 densely and coarsely punctate; sternum shallowly concave centrally, mesal area with slight longitudinal protuberance, S2 with felt line. Genitalia as in fig. 53.

REDESCRIPTION

MALE: Length 13.16-19.53 (mean 16.35) mm. Head, including clypeus and antenna, pale to medium yellowish-brown; mandible almost entirely pale yellowish-brown, apex black, ventral tooth pale reddish-black; mesosoma medium yellowish-brown; legs, including coxae and tibial spurs, pale yellowish-brown; forewing lightly infuscated posterior to pterostigma; pterostigma and wing veins pale yellowish-brown; metasoma with T1 entirely medium yellowish-brown, except posterior portion of dorsal surface dark yellowish-brown, T2-T6 dark reddish-brown, becoming dark yellowish-brown posteriorly, sterna paler than corresponding terga; entire body, especially legs and metasoma, covered with long, pallid setae.

Head transverse, subtrapezoidal, 1.43-1.47 (mean 1.45) X as wide as long, 0.96-0.99 (mean 0.97) X as wide as mesosoma, 1.46-1.52 (mean 1.49) X as wide as vertex, 1.54-1.61 (mean 1.57) X as long as compound eye, sides behind compound eyes strongly subparallel, distinct from weakly convex posterior margin. Frons with moderate fine punctation, interspaces shiny and subequal to puncture diameter; foveola shallow; surface between median ocellus and foveola without longitudinal median groove, between toruli longitudinal median groove subrounded in section and shallow, often indistinct; scrobal carina arcuate, extending beyond scrobal tubercle, which is transversely elongated; antennal tubercle simple, with sparse fine punctation. Vertex 0.70 (mean 0.70) X as long as wide, 1.32-1.40 (mean 1.36) X as wide as frons; posterior to lateral ocellus with moderate fine punctation, interspaces shiny and subequal to puncture diameter. Compound eye with ommatidia distinct. Ocelli large, convex and broadly oval, median ocellus 0.86-0.87 (mean 0.86) X as long as wide, interocellar distance 0.97-1.19 (mean 1.08) X ocellocular distance. Gena with moderate medium punctation, interspaces irregular and subequal to puncture diameter. Clypeus 0.26-0.35 (mean 0.30) X as high as wide, free border straight to slightly posteriorly concave; central portion raised and slightly convex, with dense medium punctation, interspaces narrower than puncture diameter; vestiture length 2-3 X longer than height of clypeus, densely clumped on central raised portion. Mandible higher than thick, dorsal rim with an enlarged vertical subtriangular flange ending at junction between middle and inner tooth, greatest height of flange above ventral tooth with apex subrounded; apex tridentate with apical tooth at least 2 X length of middle tooth, middle tooth indistinct, almost completely fused with apical tooth, middle and inner teeth separated by distance subequal to width of apical tooth, inner tooth subrounded to acute; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 1.27-1.30 (mean 1.29) X height at base. Antenna with scape 2.02-2.12 (mean 2.07) X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere; second flagellomere 1.27-1.33 (mean 1.30) X length of first, 0.97-1.07 (mean 1.02) X length of third.

Mesosoma, excluding anterior collar, 1.53-1.55 (mean 1.54) X as long as wide. Pronotum 0.91-0.92 (mean 0.91) X as wide as mesosoma, anterodorsal surface with moderate ill-defined punctation mesally becoming pit-like, shallow reticulations laterally, interspaces irregular, becoming pit-like shallow reticulations laterally, slightly convex, humeral angle subsquare; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct and almost as large as a reticulation; posterior portion of lateral surface with sparse fine punctation, interspaces irregular and wider than puncture diameter, posterior margin impunctate. Mesoscutum 0.77-0.82 (mean 0.80) X as long as wide, 0.82-0.85 (mean 0.84) X as wide as pronotum; between notauli with moderate medium punctation, interspaces

smooth and subequal to puncture diameter; laterally with moderate punctation, posterolaterally with dense coarse shallow punctation; posterolateral corner raised as an angulate tooth. Scutellum subsquare, entire dorsal surface densely covered with pit-like reticulations. Dorsellum with dense medium punctation, laterally simple, although edges of lateral punctures may give the impression that dorsellum is laterally ridged. Propodeum with areola same length as neighbouring areae. Mesepisternum, anterior to mesepisternal groove with moderate medium punctation, increasing in density and size posteriorly, posterior to mesepisternal groove with pit-like, shallow reticulations, reticulations approximately same size as those on anterior portion of lateral surface of pronotum, scrobe a deep subcircular depression, mesepisternal groove present, reticulations in groove twice as long as wide. Mesosternum with anterior concavity nearly impunctate, shiny, posteriorly becoming moderately to densely punctate, punctures medium and ill-defined; no mesosternal processes.

Forewing: Pterostigma 0.43-0.44 (mean 0.44) X length of anterior margin of marginal cell. Marginal cell 4.72-5.41 (mean 5.07) X as long as wide, 1.55-1.70 (mean 1.63) X length of second submarginal. Second submarginal cell sessile anteriorly, 0.49-0.51 (mean 0.50) X length of discoidal cell. Third submarginal cell with vein 3r-m tubular anterior to junction with accessory vein, nebulous posterior to junction with accessory vein; medial vein nebulous; accessory vein anteriorly tubular, posteriorly nebulous, 1.15 X longer than marginal cell.

Mid leg: Coxa unarmed; femur with greatest width in basal third, dorsal and ventral surface subparallel, shallowly concave anteriorly on basal half, slightly flattened posteriorly, often with a slight carina ventrally; tibia shallowly flattened anteriorly and posteriorly on distal half with slight carina ventrally, in cross-section subtriangular, macrosetae shorter than shorter spur, shorter spur 0.76-0.79 (mean 0.78) X length of longer spur, spurs slightly arched towards the midline and bow-like; basitarsus straight. Hind leg: Coxa entirely with sparse punctation, interspaces wider than puncture diameter, mesal margin with slight arched protruding ridge, < 0.5 X length of coxa but sometimes indistinct, ventral surface convex; trochanter simple; femur with macrosetae dense, evenly distributed, all subequal in length, longer than shorter tibial spur but shorter than longer tibial spur; tibial macrosetae densely and evenly distributed, longer than shorter spur, shorter than longer spur, shorter spur 0.62-0.76 (mean 0.69) X length of longer spur, longer spur almost straight, 0.71-0.73 (mean 0.72) X length of basitarsus; basitarsus with dense microsetae, macrosetae only on posterior margin and shorter than those on tibia, ventral surface with three to four, often indistinct rows, of short stout spines.

Metasoma 1.10-1.21 (mean 1.16) X as long as wide. First segment broad and fairly long, slightly

constricted at apex, 2.29-2.35 (mean 2.32) X as long as wide, 2.59-2.92 (mean 2.76) X as long as high, 0.98-1.03 (mean 1.01) X as long as T2; tergum, except tergulum, irregular with moderate medium punctation, laterally at midlength with swollen protuberance, tergulum with moderate fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum with dense coarse punctation, median carina absent. T2 0.92-0.98 (mean 0.95) X as long as wide, 1.01-1.08 (mean 1.05) X as wide as mesosoma, vestiture sparse, subdecumbent to suberect, anterior one-third with dense coarse ill-defined punctation, interspaces irregular and narrower than puncture diameter, posterior two-thirds shallowly and sparsely to moderately punctate, interspaces shiny, felt line 0.44-0.47 (mean 0.46) X length of tergum, length anterior to felt line 1.28-1.36 (mean 1.32) X length of tergum posterior to felt line; sternum shallowly concave centrally with setae evenly distributed and shorter than shorter mesotibial spur, anteriorly with dense coarse punctation, interspaces irregular and narrower than puncture diameter, mesal area with slight longitudinal protuberance, posteriorly with moderate fine punctation, interspaces shiny and wider than puncture diameter, felt line 0.45 X length of upper felt line. Pygidium elongate with posterior margin strongly convex, anterior one-third irregular and densely punctate, punctures ill-defined, pygidial plate slightly convex, irregular, entirely with dense fine punctation; hypopygium convex, posterior margin convex, mesal area simple. Genitalia as in fig. 53.

FEMALE: Unknown.

Holotype: ♂, "Юго-Вост. ИраН, Минаб [27°09'32"N 57°02'27"E], на свет, 1 V 1955, (Штейнберг)" . [English translation: "South-East Iran, Minab [27°09'32"N 57°02'27"E], to light, 1 V 1955, (Steynberg)"]

MATERIAL EXAMINED

TYPE MATERIAL Measured paratype: 1♂: IRAN: Minab, 27°09'32"N 57°02'27"E, 1.v.1955 (D. Steynberg) *det.* by Lelej as *Tricholabiodes mandibularis* sp. n. (1♂, IBPV).

MEASURED MATERIAL. 1♂: IRAN: Fars Prov., 4 km. N of Lar. 27°40'55"N 54°20'20", 24-29.vii.1965 (John W. Neal) (1♂, NMNH).

DISTRIBUTION

This species occurs in southwestern Asia, with specimens recorded only from Iran (fig. 93).

DISCUSSION

Lelej (1985) described this species, in Russian, from several specimens, all from the same locality. The best preserved specimen was designated as the holotype. Suárez (1990) includes this species in a catalogue of all described species of the genus.

Even though this species is most similar to *T. brothersi* (refer to the discussion following the redescription of *T. brothersi*) and bears a very slight resemblance to *T. disgregus* it is an extremely characteristic species, easily recognized by the following autapomorphic characters: the clypeus has the free border straight to slightly concave, the vestiture on the clypeus is densely clumped on the central raised portion, the mesotibia is shallowly flattened anteriorly and posteriorly on the distal half with a slight carina ventrally, and the metafemur and tibia have the macrosetae denser and longer than the shorter tibial spur. The genitalia (fig. 53) are characteristic with the parameres subtrapezoidal, tapering sharply at the apex.

The paratype matches the original description (Lelej 1985) exactly, and it seems unlikely, because of the characteristic features of this species, that Lelej would have incorrectly determined one of the paratypes. Since the holotype was not studied, information provided on the holotype label was transcribed from the original description (Lelej 1985).

Tricholabiodes ferrugineus sp. nov. ♂

DIAGNOSIS

MALE: Metasoma with T1 entirely medium yellowish-brown, T2-T6 dark reddish-brown, sterna paler than corresponding terga. Head with sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Free border of clypeus with mesal area protruding in a weak subrounded arch, arch mesally notched forming a weak denticle on each side of midline. Mandible with apices of middle and inner teeth separated by distance subequal to width of apical tooth, inner tooth subrounded. Mesepisternum with mesepisternal groove absent; no mesosternal processes. Mesal margin of metacoxa with longitudinal carina > 0.6 X length of coxa, carina with slight sclerotised ridge; femur with macrosetae longest at midlength, slightly shorter or same length as shorter tibial spur; basitarsus with macrosetae absent. Metasoma with anterior one-third of T2 with dense coarse punctation; anterior mesal area of S2 with slight carina < 0.5 X length of sternum, S2 with felt line. S3-S6 with subequal amounts of decumbent and erect setae, setae shorter than smaller mesotibial spur.

Posterior border of hypopygium convex; mesal area smooth. Genitalia as in fig. 39.

DESCRIPTION

MALE: Length 10.19 mm. Head, including clypeus, medium yellowish-brown, antenna pale yellowish-brown; mandible almost entirely pale yellowish-brown, apex black, ventral tooth pale reddish-black; mesosoma medium yellowish-brown; legs, including coxae and tibial spurs, pale yellowish-brown; forewing lightly infuscated posterior to pterostigma; pterostigma and wing veins pale yellowish-brown; metasoma with T1 entirely medium yellowish-brown, T2-T6 pale reddish-brown, sterna paler than corresponding terga; entire body, especially the metasoma, covered with long, pallid setae.

Head 1.49 X as wide as long, 1.01 X as wide as mesosoma, 1.47 X as wide as vertex, 1.44 X as long as compound eye, sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with sparse, fine to medium punctation, interspaces shiny and wider than puncture diameter; foveola shallow; surface between median ocellus and foveola smooth, without longitudinal median groove, between toruli longitudinal median groove subrounded in section and shallow; scrobal carina arcuate, not reaching scrobal tubercle; antennal tubercle simple, with sparse fine punctation. Vertex 0.54 X as long as wide, 1.32 X as wide as frons; posterior to lateral ocellus with sparse fine punctation, interspaces shiny and wider than puncture diameter. Compound eye with ommatidia indistinct. Ocelli large, convex and broadly oval, median ocellus 0.90 X as long as wide, interocellar distance 0.78 X ocellocular distance. Gena with sparse fine punctation, interspaces shiny. Clypeus 0.41 X as high as wide, free border with mesal area protruding in a weak subrounded arch, arch mesally notched forming a weak denticle on each side of midline; central portion raised and slightly convex, with sparse fine punctation, interspaces > 2 X puncture diameter; vestiture length longer than height of clypeus. Mandible higher than thick, dorsal rim with weak carina along entire length, ending at base of inner tooth; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth with apices separated by distance subequal to width of apical tooth, inner tooth subrounded; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 0.91 X height at base. Antenna with scape 2.16 X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere simple; second flagellomere 1.48 X length of first, 0.94 X length of third.

Mesosoma, excluding anterior collar, 1.65 X as long as wide. Pronotum 0.92 X as wide as mesosoma, anterodorsal surface with sparse fine punctation mesally becoming pit-like shallow reticulations laterally, strongly convex, humeral angle subsquare; anterior portion of lateral surface with pit-like, shallow

reticulations, lateral epaulet distinct and almost as large as a reticulation; posterior portion of lateral surface with sparse fine punctation, interspaces irregular and wider than puncture diameter, posterior margin impunctate. Mesoscutum 0.77 X as long as wide, 0.84 X as wide as pronotum; between notauli with moderate medium punctation, punctures decreasing in density and size posteriorly, interspaces smooth and subequal to puncture diameter; laterally with sparse fine punctation, posterolaterally with dense coarse shallow punctation; posterolateral corners raised as an angulate tooth. Scutellum subsquare, entire dorsal surface moderately covered with coarse subcircular punctation. Dorsellum with dense medium punctation, laterally simple. Propodeum with areola slightly longer than neighbouring areae. Mesepisternum with pit-like, shallow reticulations, reticulations approximately same size as those on anterior portion of lateral surface of pronotum, scrobe an indistinct subcircular depression, mesepisternal groove absent. Mesosternum with anterior concavity impunctate, posteriorly sparsely punctate, punctures fine to medium; no mesosternal processes.

Forewing: Pterostigma 0.58 X length of anterior margin of marginal cell. Marginal cell 3.87 X as long as wide, 1.33 X length of second submarginal. Second submarginal cell sessile anteriorly, 0.55 X length of discoidal cell. Third submarginal cell with vein 3r-m tubular anterior to junction with accessory vein, nebulous becoming spectral posterior to junction with accessory vein; medial vein spectral; accessory vein nebulous, 1.20 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur simple with greatest width at midlength; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.83 X length of longer spur, longer spur almost straight; basitarsus straight. Hind leg: Coxa entirely with sparse punctation, interspaces wider than puncture diameter, mesal margin with longitudinal carina > 0.6 X length of coxa, carina with a slight sclerotised ridge, ventral surface convex; trochanter simple; femur with macrosetae longest at midlength, slightly shorter or same length as shorter tibial spur; tibial macrosetae sparsely but evenly distributed, shorter than shorter spur, shorter spur 0.77 X length of longer spur, longer spur almost straight, 0.76 X length of basitarsus; basitarsus with dense microsetae, macrosetae absent, ventral surface with two rows short spines.

Metasoma 1.34 X as long as wide. First segment moderately narrow and fairly long, slightly constricted at apex, 2.37 X as long as wide, 2.64 X as long as high, 1.06 X as long as T2; tergum, except tergulum, irregular with moderate medium punctation, tergulum with moderate fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum with dense coarse punctation, median carina anteriorly continuous, posteriorly irregular. T2 0.92 X as long as wide,

1.05 X as wide as mesosoma, vestiture subdecumbent to suberect, anterior one-third with dense coarse punctation, posterior two-thirds with moderate, fine to medium punctation, interspaces shiny and subequal to puncture diameter, felt line 0.53 X length of tergum, length anterior to felt line 1.16 X length of tergum posterior to felt line; S2 convex, setae evenly distributed and shorter than shorter mesotibial spur, anteriorly with dense coarse ill-defined punctation, interspaces irregular and narrower than puncture diameter, mesal area with carina slight, < 0.5 X length of sternum, posteriorly with moderate medium punctation, punctures decreasing in density and size posteriorly, interspaces shiny, felt line 0.15 X length of upper felt line. S3-S6 with subequal amounts of decumbent and erect setae, setae shorter than smaller mesotibial spur. Pygidium transverse, posterior margin convex, anterior one-third irregular and moderately punctate, interspaces subequal to puncture diameter, pygidial plate anteriorly smooth although surface slightly irregular, posteriorly punctate, punctures ill-defined; hypopygium with posterior margin convex, mesal area simple. Genitalia as in fig. 39.

FEMALE: Unknown

MATERIAL EXAMINED

TYPE MATERIAL. Holotype: ♂, "[SAUDI] ARABIA / Asir / Besha [= Bishah; 20°30'N 43°00'E] / 17.viii.1944 / A.R. Waterston"; "Pres. By / Com. Inst. Ent. / B.M. 1950-96" (NHML).

DISTRIBUTION

This species is restricted to southwestern Asia, with a single specimen seen from Saudi Arabia (fig. 93).

DISCUSSION

This species is most similar to *T. nursei* from which it differs in the length of the macrosetae of the metafemur, and the orientation and density of the macrosetae on S4-S6. In *T. ferrugineus*, the macrosetae of the metafemur are slightly shorter or at least the same length as the shorter tibial spur and S4-S6 has subequal amounts of flat and erect setae. In *T. nursei*, the macrosetae of the metafemur are as long as the longer tibial spur and S4-S6 has all setae decumbent.

ETYMOLOGY

"*ferrugineus*" (L.), rust coloured; in reference to the colour of T2-T6.

***Tricholabiodes carinifer* Bischoff, 1920.** ♀ ♂

[*Tricholabioides* [*sic*]] *thisbe* Péringuey; Bischoff, 1920:101, 102, 103, 104 (misidentification) (?). ♂

[*Tricholabioides* [*sic*]] *carinifera* [*sic*] Bischoff, 1920:102, 109. ♀

[*Tricholabioides* [*sic*]] *carinifera* [*sic*] Bischoff; Suárez, 1990: 186. ♀

Tricholabiodes thisbe (Péringuey); Bayliss & Brothers, 1996:249-256 (misidentification). ♀ ♂

Mutilla thisbe Péringuey; Brothers (MS) (in part). ♂

DIAGNOSIS

MALE: Metasoma with T1-T2 entirely medium to dark yellowish-brown with narrow black band at apex of each segment, T3 entirely black. Head with sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Free border of clypeus strongly convex with a rounded tubercle on each side of midline. Middle and inner mandibular teeth adjacent. First flagellomere basally with ring of setae. Dorsellum laterally ridged. Mesepisternum with scrobe and mesepisternal groove present. Mesosternum with no mesosternal processes. Forewing with 2nd submarginal cell sessile anteriorly. Mesal margin of metacoxa with longitudinal carina on posterior half. Metasoma with anterior one-third of T2 with moderate medium punctation, punctures ill-defined, interspaces irregular, posterior two-thirds with fine medium punctation, interspaces shiny and subequal to puncture diameter; S2 with macrosetae slightly denser mesally than laterally and longer than shorter mesotibial spur, anterior mesal area with carina anteriorly bulbous, posteriorly slight, S2 without felt line. S3-S6 with subequal amounts of decumbent and erect setae, setae longer than smaller mesotibial spur. Mesal area of hypopygium with longitudinal depression < 0.5 X length of sternum. Genitalia as in fig. 34.

REDESCRIPTION

MALE: Length 15.10 (10.84-16.77, mean 14.79) mm. Head, including clypeus and antenna, pale to medium yellowish-brown, between ocelli dark reddish-black to black; mandible almost entirely medium to dark yellowish-brown, apex black, ventral tooth pale reddish-black; mesosoma medium yellowish-brown; legs, including coxae and tibial spurs, pale yellowish-brown; forewing lightly infuscated posterior to pterostigma; pterostigma and wing veins pale yellowish-brown; metasoma with T1-T2 entirely medium to dark yellowish-brown with narrow black band at apex of each segment, T3 entirely black, rest of metasoma medium yellowish-brown; entire body, particularly metasternum, covered in long, pallid setae.

Head 1.50 (1.44-1.65, mean 1.49) X as wide as long, 0.93 (0.91-1.03, mean 0.94) X as wide as mesosoma, 1.60 (1.49-1.68, mean 1.58) X as wide as vertex, 1.44 (1.43-1.54, mean 1.47) X as long as compound eye, sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons, anteriorly with sparse fine punctation, interspaces shiny and wider than puncture diameter, posteriorly moderately punctate; foveola deep; surface between median ocellus and foveola without longitudinal median groove though slightly longitudinally depressed, between toruli longitudinal median groove v-shape in section and deep; scrobal carina arcuate, extending to scrobal tubercle; antennal tubercle simple, with sparse fine punctation. Vertex 0.72 (0.64-0.82, mean 0.72) X as long as wide, 1.26 (1.11-1.38, mean 1.27) X as wide as frons; posterior to lateral ocellus with moderate fine punctation, interspaces shiny and subequal to puncture diameter. Compound eye with ommatidia distinct. Ocelli large, convex and broadly oval, median ocellus 0.84 (0.79-0.99, mean 0.87) X as long as wide, interocellar distance 1.31 (1.16-1.81, mean 1.37) X ocellocular distance. Gena with sparse medium punctation, interspaces irregular. Clypeus 0.42 (0.41-0.47, mean 0.44) X as high as wide, free border strongly convex with a rounded tubercle on each side of midline; central portion raised, mesally with slight longitudinally oval depression, rounded in section, with sparse fine punctation, interspaces 2 X puncture diameter; vestiture length longer than height of clypeus. Mandible higher than thick, dorsal rim with carina along entire length, ending at base of inner tooth; apex tridentate with apical tooth 2 X length of middle tooth, middle and inner teeth adjacent, inner tooth subrounded; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 0.94 (0.79-1.00, mean 0.93) X height at base. Antenna with scape 1.90 (1.53-2.05, mean 1.78) X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere basally with ring of setae; second flagellomere 1.38 (1.00-1.43, mean 1.31) X length of first, 1.07 (0.91-1.12, mean 1.03) X length of third.

Mesosoma, excluding anterior collar, 1.73 (1.63-1.77, mean 1.71) X as long as wide. Pronotum 0.88 (0.80-0.93, mean 0.88) X as wide as mesosoma, anterodorsal surface mesally irregular with ill-defined punctation becoming pit-like shallow reticulations laterally, strongly convex, humeral angle subsquare; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet small but sometimes indistinct; posterior portion of lateral surface slightly rough striated, posterior margin impunctate. Mesoscutum 0.84 (0.76-0.84, mean 0.79) X as long as wide, 0.88 (0.82-0.94, mean 0.88) X as wide as pronotum; between notauli with moderate ill-defined punctation, interspaces irregular and subequal to puncture diameter; laterally with moderate, medium to coarse punctation, posterolaterally with dense coarse punctation; posterolateral corner raised as an angulate tooth. Scutellum subsquare, entire dorsal surface densely covered with pit-like reticulations. Dorsellum with dense fine punctation, laterally ridged.

Propodeum with areola slightly longer than neighbouring areae. Mesepisternum with pit-like, shallow reticulations, larger than those on anterior portion of lateral surface of pronotum, scrobe a distinct subcircular depression, mesepisternal groove present, reticulations in groove twice as long as wide. Mesosternum with anterior concavity nearly impunctate, shiny, posteriorly becoming moderately to densely punctate, punctures fine to medium and ill-defined, anterior to mid coxa with weak, slight diagonal transverse ridge; no mesosternal processes.

Forewing: Pterostigma 0.62 (0.54-0.70, mean 0.62) X length of anterior margin of marginal cell. Marginal cell 4.21 (3.55-4.73, mean 4.06) X as long as wide, 1.49 (1.37-1.83, mean 1.55) X length of second submarginal. Second submarginal cell sessile anteriorly, 0.50 (0.40-0.58, mean 0.49) X length of discoidal cell. Third submarginal cell with vein 3r-m tubular anterior to junction with accessory vein, nebulous becoming spectral posterior to junction with accessory vein; medial vein spectral; accessory vein nebulous, 1.0 X length of marginal cell.

Legs. Mid leg: Coxa unarmed; femur simple with greatest width at midlength; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.83 (0.73-0.91, mean 0.81) X length of longer spur, longer spur almost straight; basitarsus straight. Hind leg: Coxa entirely with sparse punctation, interspaces wider than puncture diameter, mesal margin with longitudinal carina on posterior half, ventral surface flat; trochanter simple; femur with macrosetae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae only on posterior surface with several setae anteriorly, shorter than shorter spur, shorter spur 0.71 (0.62-0.82, mean 0.71) X length of longer spur, longer spur almost straight, 0.64 (0.53-0.71, mean 0.64) X length of basitarsus; basitarsus with dense microsetae, macrosetae absent, ventral surface with 3-4 , often indistinct, rows of short stout spines.

Metasoma 1.34 (1.17-1.59, mean 1.43) X as long as wide. First segment narrow, long, slightly constricted at apex, 2.61 (2.00-2.88, mean 2.50) X as long as wide, 3.05 (2.52-3.36, mean 2.95) X as long as high, 1.14 (0.88-1.17, mean 1.09) X as long as T2; tergum, except tergulum, irregular with moderate to dense, medium ill-defined punctation, tergulum with moderate fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum anteriorly with moderate fine punctation becoming densely and coarsely punctate posteriorly, median carina interrupted. T2 0.97 (0.90-1.08, mean 0.99) X as long as wide, 1.02 (0.97-1.05, mean 1.02) X as wide as mesosoma, vestiture subdecumbent to suberect, anterior one-third with moderate medium punctation, punctures ill-defined, interspaces irregular, posterior two-thirds with sparse medium punctation, interspaces shiny and subequal to puncture diameter, felt line 0.56 (0.43-0.63, mean 0.54) X length of

tergum, length anterior to felt line 1.16 (0.70-1.38, mean 1.04) X length of tergum posterior to felt line; S2 convex, macrosetae slightly denser mesally than laterally and longer than shorter mesotibial spur, entirely with moderate medium punctation, anteriorly interspaces irregular, posteriorly interspaces shiny and subequal to puncture diameter, mesal area with carina anteriorly bulbous, posteriorly slight, felt line absent. S3-S6 with subequal amounts of decumbent and erect setae, setae longer than smaller mesotibial spur. Pygidium transverse, margin defined by slightly elevated ridge, posterior margin strongly convex, anterior one-third irregular and densely punctate, interspaces narrower than puncture diameter, pygidial plate entirely with dense fine punctation, except anterolateral margin smooth; hypopygium with posterior margin convex, mesal area with longitudinal depression < 0.5 X length of sternum. Genitalia as in fig. 34.

FEMALE: Description provided in Bischoff (1920).

Holotype: ♀, "D.S.W.-Afrika [= Namibia], Windhuk [= Windhoek; 22°34'S 17°06'E], 29.4.-8.5. (Michaelsen)" (ZMHB).

MATERIAL EXAMINED

TYPE MATERIAL. Neotype: ♀: "NAMIBIA: / Namib-Naukluft Park / along Kuiseb River / 23°33'S 15°05'E / 27.i.1995 / P.S. Bayliss light trap" (SMWH).

REFERENCE SPECIMEN. 1♂: NAMIBIA: Rehoboth, 23°18'S 17°03'E, 4.ii.1995 (P.S. Bayliss) light trap (1♂, ZMHB).

MEASURED MATERIAL. 13♂: ANGOLA: [4]Pico Avezedo, 23-27.vii.1925 (Ac. 28500) (1♂, AMNH). NAMIBIA: [12]Otjinhungwa, 17°16'S 12°26'E, 17-22.xi.1970 (H2567) (1♂, SMWH); [7]Sanitatas, 18°18'S 12°51'E, 25-26.xi.1970 (H2566) (1♂, SMWH); [9]Damaraland, Khorixas, 20°21'S 14°57'E, 28-29.iii.1975 (M.J. & M-L. Penrith, H31286) (1♂, SMWH); [1]Waterberg Nat. Res., outside main entrance, 20°28'S 17°13'E, 5.iii.1995 (P.S. Bayliss) light trap (1♂, DJBC); [8]Omaruru District, Otjongoro 20, 20°53'S 15°38'E, 20-21.xii.1990 (E. Marais) (1♂, SMWH); [2]Okahandja, 21°57'S 17°00'E, 23.xii.1955 (Gaerdes, H24952) (1♂, SMWH); [6]Karibib Dist., Wilhelmstal, 47 km S., Okandukaseibe Farm No. 27, 22°20'S 16°21'E, 10.xi.1972 (C.L. Hogue) (1♂, UCRC); [10]Windhoek Distr., Eschenhof 261, 23°20'S 18°05'E, 21.xi.1989 (C.S. Roberts) (1♂, SMWH); [11]Windhoek District, Nouas, Christirina 259, 23°25'S 18°03'E, 21.xi.1989 (C.S. Roberts) (1♂, SMWH); [3, 5]Gobabeb, 23°33'S 15°05'E, 18.ii.1988 (C.D. Eardley) light trap (2♂, DJBC); [13]Maltahöhe Dist., Blässkranz 7 at:

24°06'05" 16°14'05"E, 12-14.x.1984 (J. Irish, H61848) (1♂, SMWH).

ADDITIONAL MATERIAL. 266♂: ANGOLA: Novo Redondo, 11°11'S 13°52'E, ix.1957 (A. Archer) (1♂, NMKE); Mocámedes, Pedras Aguas, 14°S 12°E, 9.v.1974 (H19050) (5♂, SMWH); Mocámedes District, Mucungo, alt. 950 ft, 14°03'S 18°30'E, x.1930 (Acc. 8994) (3♂, ICCM), 20.x.1930 (Acc. 8994) (1♂, ICCM), 25.x.1930 (Acc. 8994) (3♂, ICCM); Mocámedes, 24 mi. N.E., 400 m, 15°10'S 12°09'E, 12.xii.1966 (E.S. Ross & K. Lorenzen) (1♂, CASC); (A15) Mocámedes, 10 mls NE, 15°10'S 12°09'E, 27-29.ii.1972 (R. Giraul) (1♂, NHML); Mocámedes, Pastoril do Sul, 15°10'S 12°09'E, 8-10.v.1974 (H18812) (4♂, SMWH), 20-22.xi.1974 (H23148) (2♂, SMWH); Maluila, 15°37'S 13°07'E, 22-23.xi.1974 (H23318) *det.* by Brothers as *T. thisbe* (Péringuey) ♂ (2♂, SMWH), (H23318) (7♂, SMWH). NAMIBIA: Otjinhungwa, 17°16'S 12°26'E, 17-22.xi.1970 (H2567) (1♂, SMWH); Kaokoland, Ondorusu Falls, 5 km W., 17°24`S 13°55`E, 18-20.x.1973 (H14693) (1♂, SMWH);Omatijenguma, 8km NE, 17°58'S 12°21'E, 22-25.xi.1970 (H2565) (1♂, SMWH); Kaokoland, Orumana, 4 km E., 18°14'S 13°50'E, 24.ii.1990 (E. Marais & J. Irish) (1♂, SMWH), 8 km E., 18°14'S 13°53'E, 25.ii.1990 (E. Marais & J. Irish) (2♂, SMWH); Etosha Nat. Park, Helio, 19°01'S 16°30'E, 11.x.1986 (E. Marais & M+E Griffin) (1♂, SMWH); Hoarusib Otshu, 19°04'S 12°33'E, iii.1926 (Mus. Exped.) (1♂, SAMC); Kaokoland, Okambondevlakte, 19°12'S 13°29'E, 24.ii.1985 (J. Irish & H. Rust, H63587) (1♂, SMWH); Tsumeb to Asis, 19°13'S 17°42'E, 19.xi.1933 (K. Jordan, Brit. Mus 1934-110) (1♂, NHML); Tsumeb, Ghaub 47, 19°13'S 17°42'E, 19-28.xi.1972 (H10729) (1♂, SMWH); Otavi District, Aigamas 471, 19°28'S 17°17'E, 1-2.xi.1985 (J. Irish, H64461) (1♂, SMWH); Tsumeb District, Ghaub 47, 19°29'S 17°47'E, 3-4.xi.1985 (J. Irish, H64540) (1♂, SMWH); Kamanyab, 19°35'S 14°51'E, i.1925 (Mus. Exp.) (1♂, SAMC); Elefantenberg, Farm Achalm, 9 km S. Otavi, 19°44'S 17°21'E, 12.iii.1987 (R. Oberprieler) (1♂, NCSA); Outjo, 30 km W., 20°08'S 16°08'E, 6.iii.1995 (P.S. Bayliss) light trap (2♂, DJBC); Welwitschia, 13 mi. SE, 800 m, 20°22'S 14°58'E, 22.xii.1966 (E.S. Ross & K. Lorenzen) (2♂, CASC); Damaraland, Khorixas, 20°23'S 14°55'E, 11-12.v.1978 (M.-L. Penrith & S. Louw, H36015) (1♂, SMWH); Waterberg Nat. Res., outside main entrance, 20°28'S 17°13'E, 5.iii.1995 (P.S. Bayliss) light trap (2♂, DJBC); Otjiwarongo, 20°29'S 16°36'E, ii.1920 (R.W. Tucker) *det.* as *T. thisbe* (1♂, SAMC); Damaraland, Torra Bay Road, 30 km W turnoff, 20°30'S 14°30'E, 6-9.vi.1976 (S. Louw, H32710) (3♂, SMWH); Otjiw. Dist., Otjiwarongo, 50 km ESE, Okosongomingo Farm No. 149, 20°39'S 17°05'E, 14.xi.1972 (C.L. Hogue) (5♂, SMWH); Otjiwarongo, Okosongomingo 148, 20°39'S 17°05'E, 14-18.xi.1972 (H10581) (1♂, SMWH); Damaraland, Sebraskop 410, 20°44'S 15°09'E, 13.iv.1987 (J. Irish & E. Marais) (1♂, SMWH); Otjiwarongo, Elshorst 90, 20°58'S 16°15'E, 11-12.i.1975 (H29192) (1♂, SMWH); Omaruru District, Weissenfels 35 at: 21°04'S 15°59'E, 11.ii.1986 (J. Irish, H64943) (2♂, SMWH); Brandberg, Uis, 40 km W., 21°08'S 14°35'E, 1-2.iii.1994 (P.S.

Bayliss) light trap (1♂, DJBC); Amieb Game Res., 21°45'S 15°38'E, 22.ii.1988 (G.D. Butler) (3♂, NCSA); Farm Amieb, 21°48'S 15°39'E, 10.iii.1987 (R. Oberprieler) (1♂, NCSA); Okahandja, 21°57'S 17°00'E, 1-12.ii.1928 (R.E. Turner, Brit. Mus. 1928-61) (1♂, NHML), 3-9.ii.1928 (R.E. Turner, Brit. Mus. 1928-119) (1♂, NHML), 24.ii-1.iii.1928 (R.E. Turner, Brit. Mus. 1928-157) (1♂, NHML), 19-29.xii.1927 (R.E. Turner, Brit. Mus. 1928-53) (1♂, NHML); Okahandja (31), 21°57'S 17°00'E, 3-4.ii.1972 (Southern African Exp., B.M. 1972-1) (1♂, NHML); Usakos, 21°58'S 15°35'E, 22.ii. (G.D. Butler) (1♂, NCSA); Karibib, 21°59'S 15°51'E, ii.1978 (C. Kok & S.J. v. Tonder) (1♂, NCSA); Karibib, Noab 69, 22°08'S 15°34'E, 14-15.vi.1975 (H29291) (2♂, SMWH); Karibib Dist., Wilhelmstal, 47 km S., Okandukaseibe Farm No. 27, 22°20'S 16°21'E, 31.x.1972 (C.L. Hogue) (1♂, UCRC), 10.xi.1972 (C.L. Hogue) (1♂, UCRC), 1.xi.1972 (C.L. Hogue) (1♂, UCRC); Windhoek, Farm Otjisewa, 22°34'S 17°06'E (H. Kinges) (2♂, TMSA); Windhoek, Glynberg 326, 22°24'S 16°35'E, 5-10.ii.1975 (S. Louw, H29928) (1♂, SMWH); Windhoek, 22°34'S 17°06'E, 26.xii.1977 (Empey) (1♂, DJBC); Windhoek Caravan Park, 22°34'S 17°06'E, 5-6.ii.1995 (P.S. Bayliss) light trap (1♂, DJBC); Swakopmund, 40 mi. E., 1200 m, 22°40'S 14°34'E, 24.xii.1966 (E.S. Ross & K. Lorenzen) (3♂, CASC); Windhoek, Wasservallei (W) at 22°55'S 18°22'E, 2-23.xii.1974 (H28583) (2♂, SMWH); (22) Kuiseb Canyon, 23°18'S 15°45'E, 22-23.i.1972 (Southern African Exp., B.M. 1972-1); Rehoboth, 23°18'S 17°03'E, 4.ii.1995 (P.S. Bayliss) light trap (1♂, DJBC); Windhoek District, Eschenhof 261, 23°20'S 18°01'E, 21.xi.1989 (C.S. Roberts) (1♂, SMWH); Namib Desert Park, Aruvlei, 23°22'S 15°40'E, 3.iii.1986 (J. Irish, H65230) (1♂, SMWH); Namib Naukluft Park, Gobabeb, 23°24'S 15°03'E, i.1990 (M. Nel) light trap in Kuiseb River (1♂, SMWH); Windhoek District, Nouas, Christirina 259, 23°25'S 18°03'E, 21.xi.1989 (C.S. Roberts) (2♂, SMWH); Gobabeb, Namib Res. Station, 350 m, 23°33'S 15°05'E, 29.xii.1966 (E.S. Ross & K. Lorenzen) (1♂, CASC); Gobabeb, Kuiseb River, 23°33'S 15°05'E, 4.i.1988 (C.D. Eardley) light trap (5♂, DJBC), 6.i.1988 (C.D. Eardley) light trap (1♂, DJBC), 11.i.1988 (C.D. Eardley) light trap (5♂, DJBC), 8.ii.1988 (C.D. Eardley) light trap (1♂, DJBC), 16.ii.1988 (C.D. Eardley) light trap (1♂, DJBC), 27.ii.1988 (C.B. Eardley) light trap (1♂, DJBC); Gobabeb, 23°33'S 15°05'E, 13-15.xii.1979 (R. Wharton) (1♂, DJBC), 5.i.1988 (C.D. Eardley) light trap (3♂, DJBC), 9.i.1988 (C.D. Eardley) light trap (1♂, SMWH), 10.i.1988 (C.D. Eardley) light trap (5♂, DJBC), 30.i.1988 (C.D. Eardley) light trap (1♂, DJBC), 11.ii.1988 (C.D. Eardley) light trap (3♂, SMWH), 16.ii.1988 (C.D. Eardley) light trap (3♂, DJBC), 19.ii.1988 (C.D. Eardley) light trap (2♂, DJBC), 20.ii.1988 (C.D. Eardley) light trap (1♂, DJBC), 22.ii.1988 (C.D. Eardley) light trap (1♂, DJBC), 23.ii.1988 (C.D. Eardley) light trap (3♂, DJBC), 24.ii.1988 (C.D. Eardley) light trap (4♂, DJBC), 26.ii.1988 (C.D. Eardley) light trap (2♂, DJBC), 27.ii.1988 (C.D. Eardley) light trap (4♂, DJBC), 28.ii.1988 (C.D. Eardley) light trap (2♂, DJBC), 29.ii.1988 (C.D. Eardley) light trap (1♂, DJBC); Namib-Naukluft Park, along Kuiseb River, 23°33'S 15°05'E, 27.i.1995 (P.S. Bayliss) light trap

(1♂, DJBC), 9.ii.1995 (P.S. Bayliss) light trap (11♂, DJBC), 11.ii.1995 (P.S. Bayliss) light trap (9♂, DJBC), 14.ii.1995 (P.S. Bayliss) light trap (3♂, DJBC), 21.ii.1995 (P.S. Bayliss) light trap (7♂, DJBC), 23.ii.1995 (P.S. Bayliss) light trap (1♂, DJBC); Namib/Naukluft Park, Kuiseb R., nr Gobabeb, 23°34'S 15°03'E, 18.ii-20.iii.1983 (Nat. Coll. Kuiseb Survey) malaise trap (8♂, NCSA); Namib-Naukluft Park, Homeb, 23°38'S 15°11'E, 23.ii.1995 (P.S. Bayliss) light trap (3♂, DJBC); Namib-Naukluft Park, Homeb, 23°38'S 15°30'E, 20.ii.1988 (G.D. Butler) (19♂, NCSA), (M.W. Mansell) (7♂, NCSA); Maltahöhe, Blasskranz, 24°06'S 16°17'E, 24.x.1968 (H5522) light at night (1♂, SMWH); Kub, Gibean, 24°14'S 17°30'E, 19.xi.1971 (H5152) (1♂, SMWH); Karibib, Bethel 89, 24°27'S 19°53'E, 2-3. xi.1974 (H21630) (1♂, SMWH); (17) Maltahohe Distr., Sesriem Farm, 24°29'S 15°48'E, 19-20.i.1972 (Southern African Exp., B.M. 1972-1) (2♂, NHML); Gochas, 40 km ex Stampriet, 24°47'S 18°49'E, 25.i.1981 (4♂, UPSA), *det.* by Petersen as *T. thisbe* Pér (1♂, UPSA); Luderitz, Gorasis, 25°18'S 15°56'E, 25-31.i.1974 (H16984) (1♂, SMWH); Hoffnung, 25°23'S 16°34'E, 9-16.x.1933 (K. Jordan, Brit. Mus. 1934-110) (3♂, NHML); Namaland, Mukorob 14, 25°40'S 18°00'E, 12-14.iv.1974 (H18293) (9♂, SMWH); Helmeringhausen, 25°54'S 16°51'E, 5.iii.1987 (R. Oberprieler) light trap (4♂, NCSA); Helmeringhausen, 25°55'S 16°49'E, 17.ii.1988 (G.D. Butler) (2♂, NCSA); Namib-Naukluft Prk, Naukluft Camp site, 26°16'S 16°15'E, 6.iii.1987 (R. Oberprieler) light trap (2♂, NCSA); Bethanien, Sandverhaar 80, 26°50'S 17°25'E, 21-22.x.1976 (S. Louw & M-L. Penrith, H33398) (1♂, SMWH); Keetmanshoop, Swartbaas West 276, 26°50'S 19°00'E, 19-22.iv.1972 (H7832) (3♂, SMWH); (3) Noachabeb, 27 mls. NNE Grunau, 27°23'S 18°28'E, 10-12.i.1972 (Southern African Exp., B.M. 1972-1) (2♂,NHML); Bethanien, Churutabis 108, 27°29'S 17°28'E, 4-12.x.1974 (H20968) (1♂, SMWH); Fish River Canyon, Hobas Camp, 27°40'S 17°45'E, 1.ii.1995 (P.S. Bayliss) light trap (1♂, DJBC); Lüderitz Distr., Boomrivier, 28°01'S 17°04'E, 13-26.xi.1992 (E. Marais) Pres. pitfall trap (1♂, SMWH); Lüderitz District, Orange River at: 28°02'S 17°04'E, 15/16.iv.1986 (J. Irish) (1♂, SMWH); (W1) Nr. Onseepkans, Orange R. banks, 28°48'S 19°13'E, 8-10.i.1972 (Southern African Exp., B.M. 1972-1) (1♂, NHML). SOUTH AFRICA: Richtersveld, Nuisabies, 28°15'S 17°10'E, iii.1958 (G. van Son) (1♂, TMSA), 24.iii.1958 (G. van Son) (1♂, TMSA); Richtersveld National Park, Potjiespram, 28°18'S 16°58'E, 29.i.1995 (P.S. Bayliss) light trap (2♂, DJBC); Vioolsdrif, Orange R., 28°50'S 17°39'E, 4-6.10.1966 (1♂, SAMC); Groblershoop, 28°53'S 21°59'E, iv.1979 (C. Moolman) (1♂, NCSA); Pofadder, 29°09'S 19°27'E, 26.i.1995 (P.S. Bayliss) light trap (1♂, DJBC); Cape Town, Table Mtn, 34°02'S 18°27'E, xi.1925 (Ac. 27278) *det.* by Brothers as *Tricholabiodes* (1♂, AMNH).

DISTRIBUTION

Both males and females have broad distributions in southern Africa, recorded from southern Angola, Namibia and northwestern and southwestern South Africa. They appear to be restricted to the more arid

regions, except for the one specimen collected on Table Mountain (Cape Town) (fig. 94).

DISCUSSION

According to Bischoff (1920) the holotype of *T. carinifer* should be housed in the Museum für Naturkunde der Humboldt-Universität (Berlin). The curator, F. Koch, has indicated (1993, pers. comm.[3]) that the museum should, but does not have the holotype and has no record to whom they might have loaned it. None of the other museums, from whom specimens were loaned for this study, know the whereabouts of the holotype of *T. carinifer*. Since the males of *T. carinifer*, *T. longicarinatus*, *T. thisbe* and *T. convexus* are very similar, the females may actually turn out to be nearly indistinguishable. For this reason, the female observed copulating by Bayliss & Brothers (1996) is designated here as the neotype.

The information on the holotype label, given above, was transcribed from the original description of *T. carinifer* (Bischoff 1920). Only a description of the male is provided since females are not dealt with in this study. The Reference Specimen refers to the male specimen upon which the above description is based.

This species was described by Bischoff (1920) from a single female specimen. I have not seen the type of *T. carinifer* but have studied several specimens identified by various collectors as *T. carinifer*. These specimens match Bischoff's description and key out as *T. carinifer* in his key. The female of *T. carinifer* is distinctive. It is the only described southern African female of *Tricholabiodes* to have a darkened metasoma and longitudinal carinae two-thirds the length of T2.

Bayliss & Brothers (1996) associated the sexes of *T. carinifer* based on mating observations, but incorrectly identified the male as *T. thisbe*. They based their identification of the male on Bischoff's key. It was subsequently realized (Brothers MS), upon inspection of the syntypes of *T. thisbe*, that the male had been incorrectly identified, and was actually undescribed. Since Bischoff (1920), in redescribing *T. thisbe*, did not examine any of the type specimens, he probably misidentified *T. carinifer* ♂, as *T. thisbe*.

Tricholabiodes carinifer ♂, is morphologically very similar, especially in coloration, to *T. thisbe*, *T convexus* and *T. longicarinatus*. *Tricholabiodes carinifer* ♂, can easily be separated from the latter two

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mentioned species, for *T. longicarinatus* has a well developed mesal carina on S2 more than half the length of the segment, while *T. convexus* has the posterior half of the mesal margin of the metacoxa slightly ventrally enlarged and strongly carinate (in cross-section the metacoxa appears subtriangulate). *Tricholabiodes carinifer* ♂, has the mesal carina on S2 anteriorly bulbous and posteriorly slight and shorter than half the length of the segment. Also, the mesal margin of the metacoxa has a longitudinal carina only on the posterior half. *Tricholabiodes thisbe* and *T. carinifer* ♂, more closely resemble each other than the other two species, *T. convexus* and *T. longicarinatus*. These two species, *T. thisbe* and *T. carinifer* ♂, can be readily separated from each other by the presence, in *T. carinifer*, of a ring of setae on the basal half of the first flagellomere. This ring of setae is absent in *T. thisbe*. The genitalia (figs 34 & 50) are also very distinctive and leave one in no doubt as to the identity of these two species.

Tricholabiodes alveolus **sp. nov.** ♂

DIAGNOSIS

MALE: Metasoma with T1 entirely medium yellowish-brown, T2-T3 entirely dark reddish-black, sterna paler than corresponding terga, T4-T6 medium yellowish-brown. Head with sides behind compound eyes distinctly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with scrobal carina arcuate, not reaching scrobal tubercle. Free border of clypeus strongly convex with a rounded tubercle on each side of midline. Middle and inner mandibular teeth adjacent, inner tooth subrounded. Dorsellum laterally ridged. Mesepisternum with scrobe and mesepisternal groove present; no mesosternal processes. Forewing with second submarginal cell sessile anteriorly. Mesal margin of metacoxa simple; tibial macrosetae only on posterior surface with several setae anteriorly. Metasoma with anterior one-third of T2 with longitudinal rectangular reticulations, with sparse fine punctation within each reticulation; anterior mesal area of S2 with slight carina < 0.5 X length of sternum, S2 without felt line. Pygidium with pygidial plate anteriorly smooth although surface slightly irregular, posteriorly with dense fine punctation; posterior margin of hypopygium convex. Genitalia as in fig. 49.

DESCRIPTION

MALE: Length 11.60 mm. Head medium to dark yellowish-brown; clypeus and antenna pale yellowish-brown; mandible almost entirely pale yellowish-brown, apex black, ventral tooth pale reddish-black; mesosoma medium yellowish-brown; legs, including coxae and tibial spurs, pale yellowish-brown; forewing lightly infuscated posterior to pterostigma; pterostigma and wing veins pale yellowish-brown; metasoma with T1 entirely medium yellowish-brown, T2-T3 entirely dark reddish-black, sterna paler

than corresponding terga. T4-T6 medium yellowish-brown; entire body sparsely covered with pallid setae.

Head 1.44 X as wide as long, 0.96 X as wide as mesosoma, 1.48 X as wide as vertex, 1.50 X as long as compound eye, sides behind compound eyes distinctly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with sparse, fine to medium punctation, interspaces shiny and wider than puncture diameter; foveola deep; surface between median ocellus and foveola slightly longitudinally depressed, between toruli longitudinal median groove v-shape in section and deep; scrobal carina arcuate, not reaching scrobal tubercle; antennal tubercle simple, with sparse fine punctation. Vertex 0.63 X as long as wide, 1.14 X as wide as frons; posterior to lateral ocellus with sparse fine punctation, interspaces shiny and wider than puncture diameter. Compound eye with ommatidia distinct. Ocelli large, convex and broadly oval, median ocellus 1.10 X as long as wide, interocellar distance 0.82 X ocellocular distance. Gena with sparse medium punctation, interspaces irregular. Clypeus 0.40 X as high as wide, free border strongly convex with a rounded tubercle on each side of midline; central portion raised and slightly convex, with sparse medium punctation, interspaces 3 X puncture diameter; vestiture length longer than height of clypeus. Mandible higher than thick, dorsal rim with carina along entire length, ending at base of inner tooth; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth adjacent, inner tooth subrounded; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 0.91 X height at base. Antenna with scape 1.77 X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere simple.

Mesosoma, excluding anterior collar, 1.75 X as long as wide. Pronotum 0.87 X as wide as mesosoma, anterodorsal surface mesally with dense ill-defined punctation, becoming pit-like shallow reticulations laterally, strongly convex, humeral angle subrounded; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct and almost as large as a reticulation; posterior portion of lateral surface with sparse fine punctation, interspaces irregular and wider than puncture diameter, posterior margin impunctate. Mesoscutum 0.77 X as long as wide, 0.87 X as wide as pronotum; between notauli with sparse medium punctation, interspaces smooth and wider than puncture diameter; laterally with sparse to moderate, medium punctation, posterolaterally with dense coarse punctation; posterolateral corner raised as an angulate tooth. Scutellum subsquare, entire dorsal surface densely covered with coarse subcircular punctations. Dorsellum densely punctate, laterally ridged. Propodeum with areola same length as neighbouring areae. Mesepisternum, anterior to mesepisternal groove with dense coarse subcircular punctation, posterior to mesepisternal groove with pit-like, shallow

reticulations, reticulations approximately same size as those on anterior portion of lateral surface of pronotum, scrobe a subcircular depression, mesepisternal groove present. Mesosternum with anterior concavity nearly impunctate, shiny, posteriorly sparsely punctate, punctures fine; no mesosternal processes.

Forewing: Pterostigma 0.68 X length of anterior margin of marginal cell. Marginal cell 3.06 X as long as wide, 1.29 X length of second submarginal. Second submarginal cell sessile anteriorly, 0.42 X length of discoidal cell. Third submarginal cell with vein 3r-m tubular anterior to junction with accessory vein, nebulous becoming spectral posterior to junction with accessory vein; medial vein spectral; accessory vein nebulous, 1.5 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur simple with greatest width at midlength; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.76 X length of longer spur, longer spur almost straight; basitarsus straight. Hind leg: Coxa entirely with moderate medium punctation, interspaces subequal to puncture diameter, mesal margin simple, ventral surface convex; trochanter simple; femur with macrosetae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae only on posterior surface with several setae anteriorly, shorter than shorter spur, shorter spur 0.69 X length of longer spur, longer spur almost straight, 0.76 X length of basitarsus; basitarsus with dense microsetae, macrosetae absent, ventral surface with two rows short stout spines.

Metasoma 1.52 X as long as wide. First segment moderately narrow and fairly long, slightly constricted at apex, 2.29 X as long as wide, 2.24 X as long as high, 0.96 X as long as T2; tergum, except tergulum, with dense coarse subcircular punctation, tergulum moderately and finely punctate anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum with dense coarse punctation, median carina absent. T2 1.00 X as long as wide, 0.96 X as wide as mesosoma, vestiture sparse, anterior one-third with longitudinal rectangular reticulations, sparsely and finely punctate within each reticulation, posterior two-thirds shallowly and moderately punctate, interspaces shiny and subequal to puncture diameter, felt line 0.53 X length of tergum, length anterior to felt line 0.85 X length of tergum posterior to felt line; S2 convex, setae evenly distributed and shorter than shorter mesotibial spur, entirely with moderate medium punctation, interspaces shiny and subequal to puncture diameter, mesal area with slight carina < 0.5 X length of sternum, felt line absent. Pygidium transverse, margin defined by slightly elevated ridge, posterior margin strongly convex, anterior one-third sparsely punctate, interspaces smooth and wider than puncture diameter, pygidial plate anteriorly smooth although surface slightly irregular, posteriorly with dense fine punctation; hypopygium

with posterior margin convex, mesal area simple. Genitalia as in fig. 49.

FEMALE: Unknown.

MATERIAL EXAMINED

TYPE MATERIAL. Holotype: ♂, "J.J.S. LE ROUX / O'KEEP [= O'Kiep; 29°36'S 17°54'E] / SUID-AFRIKA / [= South Africa] 16.1.1944" (SAMC).

DISTRIBUTION

This species occurs in southern Africa with one specimen seen from northwestern South Africa (fig. 95).

DISCUSSION

Although, this species is most similar to *T. thisboides* it can be readily separated by colour. In *T. alveolus*, T2 is entirely dark reddish-black, while *T. thisboides* has T2 entirely pale to medium yellow-brown with a narrow dark reddish-black band at the apex. The genitalia (figs 49 & 51) are also very distinctive and leave one in no doubt to the identity of these two species.

ETYMOLOGY

"*alveolus*" (L.), cavity; in reference to orientation of cavity opening on the volsellae.

Tricholabiodes thisbe (Péringuey, 1898). ♂

Mutilla thisbe Péringuey, 1898:45, 86. ♂

M. [*utilla* (*Tricholabiodes*)] *thisbe* Pér; André, 1901:285. ♂

T. [*richolabiodes*] *tisbe* [*sic*] Péringuey; André, 1902:21. ♂

[*Tricholabioides* [*sic*]] *thisbe* Péringuey; Bischoff, 1920:101, 102, 103, 104 (in part). ♂

[*Tricholabioides* [*sic*]] *thisbe* Péringuey; Suárez, 1990:187. ♂

Mutilla thisbe Péringuey; Brothers (MS) (in part). ♂

DIAGNOSIS

MALE: Metasoma with T1 and T2 entirely pale to medium yellow-brown with narrow dark reddish-black band at apex of each segment, T3 dark reddish-black to black. Head with sides behind compound eyes distinctly convergent posteriorly and gradually merging with weakly convex posterior margin. Free

border of clypeus strongly convex with a rounded tubercle on each side of midline. Middle and inner mandibular tooth adjacent. Dorsellum laterally ridged. Mesepisternum with scrobe and mesepisternal groove present. Mesosternum with no mesosternal processes. Forewing with 2nd submarginal cell sessile anteriorly. Mesal margin of metacoxa simple. Metasoma with anterior one-third of T2 with moderate coarse punctations, punctations ill-defined, interspaces irregular; anterior mesal area of S2 with slight carina < 0.5 X length of sternum, S2 without felt line. Pygidium with pygidial plate entirely smooth, except lateral and posterior margin finely punctured; posterior margin of hypopygium convex. Genitalia as in fig. 50.

REDESCRIPTION

MALE: Length 10.03 (8.87-14.33, mean 11.93) mm. Head, including clypeus and antenna, pale to medium yellowish-brown, between ocelli dark yellowish-brown to medium reddish-black; mandible almost entirely pale yellowish-brown, apex black, ventral tooth pale to medium reddish-black; mesosoma pale to medium yellowish-brown; legs, including coxae and tibial spurs, pale yellowish-brown; forewing darkly infuscated posterior to pterostigma; pterostigma and wing veins pale yellowish-brown; metasoma with T1-T2 entirely pale to medium yellowish-brown with narrow dark reddish-black band at apex of each segment, T3 entirely dark reddish-black to black, rest of metasoma dark yellowish-brown to pale reddish-black; entire body covered with long, pallid setae.

Head 1.43 (1.43-1.57, mean 1.51) X as wide as long, 0.98 (0.86-1.01, mean 0.95) X as wide as mesosoma, 1.51 (1.44-1.71, mean 1.57) X as wide as vertex, 1.44 (1.33-1.55, mean 1.46) X as long as compound eye, sides behind compound eyes distinctly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with sparse fine punctation, interspaces shiny and wider than puncture diameter; foveola deep; surface between median ocellus and foveola without longitudinal median groove though longitudinally depressed, between toruli longitudinal median groove v-shape in section and deep; scrobal carina arcuate, not reaching scrobal tubercle but sometimes indistinct; antennal tubercle simple, with sparse fine punctation. Vertex 0.66 (0.58-0.81, mean 0.72) X as long as wide, 1.33 (1.15-1.44, mean 1.28) X as wide as frons; posterior to lateral ocellus with sparse fine punctation, interspaces shiny and wider than puncture diameter. Compound eye with ommatidia distinct. Ocelli large, convex and broadly oval, median ocellus 0.74 (0.85-1.03, mean 0.90) X as long as wide, interocellar distance 1.44 (1.32-1.76, mean 1.49) X ocellocular distance. Gena with sparse medium punctation, interspaces irregular. Clypeus 0.40 (0.39-0.48, mean 0.43) X as high as wide, free border strongly convex with a rounded tubercle on each side of midline; central portion raised, mesally with slight longitudinal oval depression, subrounded in section, sparsely and finely punctate, interspaces 2

X puncture diameter; vestiture length longer than height of clypeus. Mandible higher than thick, dorsal rim with carina along entire length, ending at base of inner tooth; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth adjacent, inner tooth subrounded; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 0.93 (0.85-1.10, mean 0.97) X height at base. Antenna with scape 1.52 (1.31-1.85, mean 1.61) X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere simple; second flagellomere 1.26 (1.26-1.50, mean 1.24) X length of first, 1.05 (0.98-1.17, mean 1.10) X length of third.

Mesosoma, excluding anterior collar, 1.76 (1.59-1.85, mean 1.74) X as long as wide. Pronotum 0.90 (0.78-0.91, mean 0.87) X as wide as mesosoma, anterodorsal surface mesally irregular with ill-defined punctation becoming pit-like shallow reticulations laterally, strongly convex, humeral angle subrounded; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct and almost as large as a reticulation; posterior portion of lateral surface with sparse fine punctation, interspaces irregular and wider than puncture diameter, posterior margin impunctate. Mesoscutum 0.78 (0.76-0.86, mean 0.80) X as long as wide, 0.86 (0.81-0.93, mean 0.88) X as wide as pronotum; entirely with moderate medium punctation, interspaces smooth and subequal to puncture diameter, posterolaterally with dense coarse punctation; posterolateral corner raised as an angulate tooth. Scutellum subsquare, entire dorsal surface densely covered with coarse sub-circular punctations. Dorsellum with dense fine punctation, laterally ridged. Propodeum with areola slightly longer than neighbouring areae. Mesepisternum with pit-like, shallow reticulations, slightly larger than those on anterior portion of lateral surface of pronotum, scrobe a distinct subcircular depression, mesepisternal groove present but sometimes indistinct. Mesosternum with anterior concavity nearly impunctate, shiny, posteriorly becoming moderately to densely punctate, punctures fine and ill-defined; no mesosternal processes.

Forewing: Pterostigma 0.67 (0.40-0.95, mean 0.69) X length of anterior margin of marginal cell. Marginal cell 3.18 (2.70-4.00, mean 3.35) X as long as wide, 1.35 (1.28-1.41, mean 1.38) X length of second submarginal. Second submarginal cell sessile anteriorly, 0.42 (0.39-0.53, mean 0.46) X length of discoidal cell. Third submarginal cell with vein 3r-m tubular anterior to junction with accessory vein, nebulous becoming absent posterior to junction with accessory vein; medial vein absent; accessory vein nebulous, 1.45 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur simple with greatest width at midlength; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.70 (0.64-0.74, mean 0.71) X length of longer spur,

longer spur almost straight; basitarsus straight. Hind leg: Coxa entirely with sparse punctation, interspaces wider than puncture diameter, mesal margin simple, edges of punctation may give impression of a mesal carina, ventral surface flat; trochanter simple; femur with macrosetae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae mostly on posterior surface with several setae anteriorly, shorter than shorter spur, shorter spur 0.70 (0.65-0.79, mean 0.70) X length of longer spur, longer spur almost straight, 0.78 (0.52-0.80, mean 0.71) X length of basitarsus; basitarsus with dense microsetae, macrosetae absent, ventral surface with two, often indistinct, rows of short spines.

Metasoma 1.35 (1.14-1.69, mean 1.38) X as long as wide. First segment moderately narrow and fairly long, slightly constricted at apex, 2.62 (1.78-2.91, mean 2.40) X as long as wide, 3.14 (2.11-3.19, mean 2.64) X as long as high, 1.11 (0.73-1.13, mean 0.99) X as long as T2; tergum, except tergulum, irregular with moderate, medium to coarse punctation, tergulum with moderate fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum anteriorly with moderate fine punctation becoming densely and coarsely punctate posteriorly, median carina interrupted. T2 1.00 (0.97-1.08, mean 1.03) X as long as wide, 1.00 (0.94-1.04, mean 0.98) X as wide as mesosoma, vestiture subdecumbent to suberect, anterior one-third with moderate coarse ill-defined punctation, interspaces irregular, posterior two-thirds shallowly and moderately punctate, interspaces shiny and subequal to puncture diameter, felt line 0.57 (0.41-0.56, mean 0.49) X length of tergum, length anterior to felt line 1.00 (0.77-1.28, mean 0.98) X length of tergum posterior to felt line; S2 convex, setae evenly distributed and shorter than shorter mesotibial spur, entirely with moderate, medium to coarse punctation, punctures decreasing slightly in size posteriorly, anteriorly punctures ill-defined, mesal area with slight carina < 0.5 X length of sternum, felt line absent. Pygidium transverse, posterior margin convex, anterior one-third irregular and moderately punctate, interspaces subequal to puncture diameter, pygidial plate entirely smooth, except lateral and posterior margin finely punctured; hypopygium with posterior margin convex, mesal area simple. Genitalia as in fig. 50.

FEMALE: Unknown.

MATERIAL EXAMINED

TYPE MATERIAL. Lectotype: 1♂, "[SOUTH AFRICA:] Van Wyk / Vley [32°07'S 19°43'E] // E. Alston / Feb[ruar]y [18]85"; "37"; "*Mutilla* / *Thisbe* [*sic*] / typ[e] ♂. P[éringue]y"; "*Tricholabiodes* / *thisbe* P[éringuey]. / var." [Péringuey's handwriting]; "TYPE"; "LECTOTYPE / *Mutilla* / *thisbe* ♂ / Péringuey 1898 / det. D.J. Brothers, 1982"; "SAM-HYM- / AO18417" (1♂, SAMC).

Paralectotype: 1♂: SOUTH AFRICA: Van Wyk Vley, 32°07'S 19°43'E, ii.1885 (E. Alston) SAM-HYM-AO18418, *det.* by Péringuey as *Tricholabiodes thysbe* [*sic*] P[éringue]y, sec. typ., *det.* by Brothers (who designated specimen as paralectotype) *Mutilla thisbe* Péringuey ♂ (1♂, SAMC).

MEASURED MATERIAL. 10♂: ANGOLA: [3]Mocámedes, Pastoril do Sul, 15°S 12°E, 20-22.xi.1974 (H23149) (1♂, SMWH). NAMIBIA: [9]Otjiwarongo, 20°29'S 16°36'E, xi.1920 (J.S. Brown) (1♂, SAMC); [5]Karibib Dist., 47 km S. Wilhelmstal, Okandukaseibe Farm No. 27, 22°20'S 16°21'E, 10.xi.1972 (C.L. Hogue) (1♂, UCRC); [10]Swakopmund, 40 mi. E., 1200 m, 22°40'S 14°34'E, 24.xii.1966 (E.S. Ross & K. Lorenzen) (1♂, CASC); [1]Windhoek, Wasservallei (W) at 22°55'S 16°22'E, 20-23.xii.1974 (H28583) (1♂, SMWH); [2]Rehoboth, 23°18'S 17°03'E, 4.ii.1995 (P.S. Bayliss) light trap (1♂, DJBC); [6]Namib Camp site, Namib-Naukluft Prk, 26°16'S 16°15'E, 6.iii.1987 (R. Oberprieler) light trap (1♂, NCSA); [7]Bethanien, Huns 106, 27°50'S 17°10'E, 29.ix-4.x.1974 (H20763) (1♂, SMWH). SOUTH AFRICA: [4]Richtersveld, Numees Mine, 28°18'S 16°58'E, 16-20.ii.1979 (Lamoral, Bampton & Barnley) (1♂, DJBC); [8]Richtersveld National Park, Potjiespram, 28°18'S 16°58'E, 29.i.1995 (P.S. Bayliss) light trap (1♂, DJBC).

ADDITIONAL MATERIAL. 356♂: ANGOLA: Pico Avezedo, 23-27.vii.1925 (Ac. 28500) (1♂, AMNH); Mocámedes, Pedras Aguas, 14°S 12°E, 9.v.1974 (H19050) (3♂, SMWH); Fazenda Mahita, SE Vila Arriaga, 14°48'S 13°23'E, 1-2.xii.1974 (H23944) (1♂, SMWH); Mocámedes, Pastoril do Sul, 15°S 12°E, 8-10.v.1974 (H18812) (5♂, SMWH), 20-22.xi.1974 (H23149) (2♂, SMWH); Capangombe, 5 km E., 15°05'S 13°10'E, 17-20.xi.1974 (H22637) (1♂, SMWH); Maluila, 15°37'S 13°07'E, 22-23.xi.1974 (H23318) (6♂, SMWH); Chibemba, 26 mi. S., 1170 m, 15°43'S 14°07'E, 15.xii.1966 (E.S. Ross & K. Lorenzen) (1♂, CASC); Mongua, 10 mi. SE., 1100 m, 16°43'S 15°22'E, 16.xii.1966 (E.S. Ross & K. Lorenzen) (2♂, CASC). NAMIBIA: Otjikata Lake, 16.xi.1933 (K. Jordan, Brit. Mus. 1934-110) (1♂, NHML); (K. Jordan, Brit. Mus. 1934-110) (2♂, NHML); x.1972 (C.L. Hogue) (2♂, UCRC); Kaokoland, Okokatuwo, 17°24'S 12°34'E, 12-16.v.1991 (E. Griffin) (2♂, SMWH); Kaokoland, Hartmannberge, W at 17°26'S 12°17'E, 18.viii.1973 (H13563) (1♂, SMWH); Owambo, Ruacana Falls, 17°26'S 14°21'E, 26-27.viii.1973 (H13996) (1♂, SMWH); Kaokoland, Orumana, 4 km E., 18°14'S 13°50'E, 24.ii.1990 (E. Marais & J. Irish) (1♂, SMWH); Kaokoland, Orumana, 8 km E., 18°14'S 13°53'E, 25.ii.1990 (E. Marais & J. Irish) (1♂, SMWH); Sanitatas, 18°18'S 12°51'E, 25-26.xi.1970 (H2566) (2♂, SMWH); Etosha, Bloubokkiedraai, 18°52'S 16°58'E, 13.x-15.xi.1986 (E. Griffin, Etosha Nat. Pk. Survey) Preser. traps (2♂, SMWH); Etosha Pan, Okaukuejo camp, 19°11'S 15°15'E, 24.xii.1974 (Endödy-Younga, E-Y:517) at black light (1♂, TMSA); Etosha Nat. Park, Dungaries, 19°11'S 16°47½'E, 14.i.1987 (E. Marais & J. Irish) (2♂, SMWH); Tsumeb, 19°13'S 17°42'E, i.1920

(E. Koohig) (1♂, SAMC); Tsumeb to Asis, 19°13'S 17°42'E, 19.xi.1933 (K. Jordan) (1♂, NHML); Nurugas, 19°16'S 18°46'E, i.1920 (R.W. Tucker) (1♂, SAMC); Etosha Nat. Park, Nau-Obes, 19°19'S 16°37'E, 17.i.1987 (J. Irish & E. Marais) (3♂, SMWH); Otavi District, Algamas 471, 19°28'S 17°17'E, 1-2.xi.1985 (J. Irish, H64461) (1♂, SMWH); Kaross, 19°30'S 14°20'E, ii.1925 (Mus. Exped.) (1♂, SAMC); Grootfontein, 19°34'S 18°07'E, i.1920 (R.W. Tucker) (1♂, SAMC); Kamanyab, 19°35'S 14°51'E, i.1925 (Mus. Exped.) (1♂, SAMC); Otavifontein, 19°39'S 17°24'E, 20.xi.1933 (K. Jordan, Brit. Mus. 1934-110) (1♂, NHML); (W37) Kamanjab, Otjitambi Farm, 27 mls. ESE., 19°49'S 15°10'E, 13-15.ii.1972 (Southern African Exp., B.M. 1972-1) (4♂, NHML); Otjikondo, 19°51'S 15°28'E, i.1925 (Mus. Exped.) (1♂, SAMC); Outjo, 20°08'S 16°08'E, 11.iii.1979 (V.B. Whitehead) (1♂, SAMC); Outjo, 30 km W., 20°08'S 16°08'E, 6.iii.1995 (P.S. Bayliss) light trap (2♂, DJBC); Welwitschia, 13 mi. SE., 800 m, 20°22'S 14°58'E, 22.xii.1966 (E.S. Ross & K. Lorenzen) (7♂, CASC); Waterberg Nat. Res., outside main entrance, 20°28'S 17°13'E, 5.iii.1995 (P.S. Bayliss) light trap (1♂, DJBC); Otjiwarongo, 20°29'S 16°36'E, ii.1920 (R.W. Tucker) (1♂, SAMC), xii.1920 (J.S. Brown) *det.* as *T. thisbe* Pér. (2♂, SAMC), i.1921 (J.S. Brown) (1♂, SAMC), i.1921 (J.S. Brown) (2♂, SAMC); Otjiw. Dist., 50 km ESE Otjiwarongo, Okosongomingo Farm No. 149, 20°39'S 17°05'E, 14.xi.1972 (C.L. Hogue) (10♂, UCRC), 16.xi.1972 (C.L. Hogue) (2♂, UCRC); Otjiwarongo, Okosongomingo 148, 20°39'S 17°05'E, 14-18.xi.1972 (H10581) (1♂, SMWH); Omaruru Distr., Otjongoro 20, 20°53'S 15°38'E, 20-21.xii.1990 (E. Marais) (1♂, SMWH); Outjo, Huab 251, 20°55'S 13°27'E, 29.xi.1972 (H10998) (1♂, SMWH); Otjiwarongo, Elshorst 90, 20°58'S 16°15'E, 11-12.i.1975 (H29192) (1♂, SMWH); Brandberg, Tsisab Valley, 21°01'S 14°41'E, viii.1948 (R.G. Strey) *det.* by Invrea as *T. thisbe* Pér. (1♂, TMSA); Omaruru, Eansiyo 100 & 101, 21°05'S 15°47'E, 8-11.i.1975 (H29030) (1♂, SMWH); Swakopmund District, Brandburg, Orabies Schlucht, 21°08'S 14°35'E, 15.iii.1985 (H. & W. Rust, H64189) (1♂, SMWH); Uis, 40 km W. Brandberg, 21°08'S 14°35'E, 1-2.ii.1994 (P.S. Bayliss) light trap (1♂, DJBC); Omaruru, 21°28'S 15°56'E, 3.iii.1995 (P.S. Bayliss) light trap (1♂, DJBC); Amieb Game Res., 21°45'S 15°38'E, 22.ii.1988 (G.D. Butler) (4♂, NCSA); Amieb Erongo Mts., "Bulls Party" Farm, 21°48'S 15°39'E, 10.iii.1987 (R. Oberprieler) (1♂, NCSA); Windhoek, 21°55'S 17°43'E, 24-26.ii.1982, M.-L. Penrith & J. Irish, H50966) (1♂, SMWH); Okahandja, 21°57'S 17°00'E, 1-12.i.1928 (R.E. Turner, Brit. Mus. 1928-61) (1♂, NHML), 20-26.i.1928 (R.E. Turner, Brit. Mus. 1928-89) (1♂, NHML), 24.ii-1.iii.1928 (R.E. Turner, Brit. Mus. 1928-157) (1♂, NHML), 2-18.iii.1928 (R.E. Turner, Brit. Mus. 1928-178) (1♂, NHML), 19-29.iii.1928 (R.E. Turner, Brit. Mus. 1928-202) (1♂, NHML), 1949 (H24951) (Gaerdes) (1♂, SMWH); (31) Okahandja, 21°57'S 17°00'E, 2-4.ii.1972 (Southern African Exp., B.M. 1972-1) (1♂, NHML); Usakos, 21°58'S 15°35'E, 22.ii. (G.D. Butler) (2♂, NCSA); (30) Amieb Farm, 19 mls. NW Karibib, 21°59'S 15°51'E, 31.i-2.ii.1972 (Southern African Exp., B.M. 1972-1) (4♂, NHML); Karibib, 21°59'S 15°51'E, ii.1978 (C. Kok & S.J. v. Tonder)

det. by Brothers as *T. thisbe* (Péringuey) (1♂, NCSA), ii;1978 (C. Kok & S.J. v. Tonder) (1♂, NCSA); Namib Desert Park, Gemsbokwater, 22°S 15°E, 4-5.v.1980 (S. Louw & M.-L. Penrith,H42019) (1♂, SMWH); Kalkfontein, 22°08'S 20°53'E, iv.1923 (J.S. Brown) (1♂, SAMC), x.1923 (J.S. Brown) (2♂, SAMC), x.1923 (J.S. Brown) *det.* as *T. thisbe* Pér. (1♂, SAMC); Karibib Dist., 47 km S. Wilhelmstal, Okandukaseibe Farm No. 27, 22°20'S 16°21'E, 31.x.1972 (C.L. Hogue) *det.* by Snelling as *T. semistriata pedunculatoides* (1♂, UCRC), 31.x.1972 (C.L. Hogue) (2♂, UCRC), 9.xi.1972 (C.L. Hogue) (1♂, UCRC), 10.xi.1972 (C.L. Hogue) (13♂, UCRC); Swakopmund Dist., Rössing, 22°28'S 15°02'E, 10.iv.1984 (J. Irish & H. Rust, H63221) (1♂, SMWH); Swakopmund Dist., Upper Ostrich Gorge, 22°29'S 14°59'E, 12.ii-11.iii.1985 (J. Irish & H. Rust, H62064) (1♂, SMWH); Windhoek, 22°34'S 17°05'E, 1987 (J. Irish) (1♂, SMWH); Windhoek, 22°34'S 17°06'E, xii.1919 (R.W. Tucker) *det.* as *T. thisbe* Pér. (1♂, SAMC); Windhoek, 22°34'S 17°06'E, xi.1959 (F. Honiball) (1♂, SMWH); Windhoek, 15 mi. S.W., 1800 m, 22°34'S 17°06'E, 25.xii.1966 (E.S. Ross & K. Lorenzen) (2♂, CASC); Windhoek, 22°34'S 17°06'E, 16-18.xi.1973 (H15115) (1♂, SMWH); Windhoek Caravan Park, 22°34'S 17°06'E, 5-6.ii.1995 (P.S. Bayliss) light trap (2♂, DJBC); Swakopmund, 40 mi. E., 1200 m, 22°40'S 14°34'E, 24.xii.1966 (E.S. Ross & K. Lorenzen) (17♂, CASC); Windhoek, Gocheganas 218, 22°49'S 17°12'E, 20.x-19.xi.1981 (M.-L. Penrith, H55601) (1♂, SMWH), 22.xii.1981-20.i.1982 (M.-L. Penrith, H55874) Preser. traps (1♂, SMWH); Windhoek, Wasservallei 382, 22°55'S 16°22'E, 21-23.xii.1973 (H16284) (1♂, SMWH); Windhoek, Wasservallei (W) at 22°55'S 16°22'E, 20-23.xii.1974 (H28583) (12♂, SMWH); Namib/Naukluft Park, Ganab, 23°06'S 15°33'E, 16.iii.1983 (C.D. Eardley) light trap (1♂, NCSA); Portsmuts, 70 m. SW. Windhoek, 23°06'S 16°25'E, viii.1954 (Vernay, Tvl. Museum Exp.) (1♂, TMSA); (22) Kuiseb Canyon, 23°18'S 15°45'E, 22-23.i.1972 (Southern African Exp., B.M. 1972-1) (1♂, NHML); Windhoek, Kos 28, 23°18'S 16°08'E, 28.iii-4.iv.1977 (M-L. Penrith & S. Louw, H34238) (1♂, SMWH); Rehoboth, 23°18'S 17°03'E, 4.ii.1995 (P.S. Bayliss) light trap (32♂, DJBC); Windhoek Dist., Gamsberg foot E., 23°20'S 16°15'E, 14.x.1984 (J. Irish, H61918) (3♂, SMWH); Windhoek District, Nouas, Christirina 259, 23°25'S 18°03'E, 21.xi.1989 (C.S. Roberts) (2♂, SMWH); Southern Namib Desert, Gobabeb, Kuiseb River Bed, 408m, 23°30'S 15°00'E, iv (1♂, TMSA), Gobabeb, 408 m, 23°30'S 15°00'E (113) (1♂, TMSA); Gobabeb, 23°33'S 15°05'E, (1♂, TMSA); Namib-Naukluft Park, Homeb, 23°38'S 15°30'E, 20.ii.1988 (G.D. Butler) (2♂, NCSA); Maltahöhe, Blässkranz, 24°06'S 16°17'E, 24.x.1968 (H5522) light at night (3♂, SMWH); Maltahöhe Dist., Blässkranz 7 at: 24°06'05"S 16°14'05"E, 12-14.x.1984 (J. Irish, H61848) (2♂, SMWH); Maltahöhe Dist., De Valle 226 at: 24°08'S 16°05'E, 10-12.x.1984 (J. Irish, H61582) (1♂, SMWH); Naukluft Park, Ubusis 3, 24°21'S 16°07'E, 18-19.ii.1984 (J. Irish, H60212) (2♂, SMWH); Karibib, Bethel 89, 24°27'S 19°53'E, 2-3.xi.1974 (H21630) (1♂, SMWH); Namib Desert Park, Sesriem Camp, 24°29'S 15°47'E, 4.iv.1986 (J. Irish, H65241) (1♂, SMWH); Namaland, Mukorob 14, 25°S 18°E, 12-

14.iv.1974 (H18293) (2♂, SMWH); Lüderitz, Gorasis 99, 25°18`S 15°56`E, 12-15.ii.1973 (H11596) (1♂, SMWH), 25-31.i.1974 (H16984) (9♂, SMWH); Hoffnung, 25°23'S 16°34'E, 27.xi.1933 (K. Jordan, Brit. Mus. 1934-110) (1♂, NHML); Diamond Area 2, Numabis Pan, 25°31'S 15°35'E, 7.iv.1986 (J. Irish, H65330) (1♂, SMWH); Huams Riv. Bed, 25°37'S 17°01'E, 31.i.1969 (B. Lamoral) (1♂, DJBC); Namaland, Mukorob 14, 25°40'S 18°00'E, 12-14.iv.1974 (H18293) (4♂, SMWH); Bethanie, Barby 26, 25°51'S 16°33'E, 2-7.x.1972 (H9235) (1♂, SMWH); Bethanie Dist., 25 km WNW Helmeringhausen, Barby Farm No. 26, 25°55'S 16°37'E, 3.x.1972 (C.L. Hogue) (1♂, UCRC), 8.x.1972 (C.L. Hogue) (2♂, UCRC); Tses, 25°58'S 18°08'E, 1924 (J.S. Brown) (2♂, SAMC); Zesfontein, 26°06'S 18°22'E, ii.1925 (Mus. Exped.) (1♂, SAMC); Namib-Naukluft Prk, Naukluft Camp site, 26°16'S 16°15'E, 6.iii.1987 (R. Oberprieler) light trap (14♂, NCSA); Keetmanshoop Dist., Khabus 146 at: 26°19'S 18°15'E, 14-15.iii.1988 (J. Irish & E. Marais) (1♂, SMWH); Kiries West, 26°35'S 18°57'E, xii.1925 (J.S. Brown) (1♂, SAMC); Lüderitz, Plateau 38, 26°40'S 16°32'E, 18.x.1970 (H2571) (1♂, SMWH); (11) Aar Farm, 25 mls. ESE. Aus, 26°43'S 16°28'E, 15-17.i.1972 (Southern African Exp., B.M. 1972-1) (7♂, NHML); Diamond Area 1, Klinghardt Mts, 27°18'S 15°41'E, 29-30.vi.1981 (M.-L. Penrith, H43461) (1♂, SMWH); Bethanien, Churutabis 108, 27°29'S 17°28'E, 4-12.x.1974 (H20968) (2♂, SMWH); Fish River, Kochasdrif, 27°40'S 17°35'E, 12-13.x.1974 (H21181) (1♂, SMWH); Fish River Canyon, nr main lookout Point, 27°40'S 17°35'E, 3.xii.1974 (M.W. Mansell) (1♂, NCSA); Fish River Canyon, Hobas Camp, 27°40'S 17°45'E, 1.ii.1995 (P.S. Bayliss) light trap (3♂, DJBC); Outjo District, Buschmannberg 234, 27°46`S 16°24`E, 19.ii.1990 (J. Irish & E. Marais) (1♂, SMWH); Namuskluft 88, 27°48'S 16°52'E, 7-15.x.1970 (H2572) (1♂, SMWH); Bethanien, Huns 106, 27°50'S 17°10'E, 29.ix-4.x.1974 (H20763) (1♂, SMWH); Rosh Pinah, Namaskluft, 27°57'S 16°46'E, 14.xi.1975 (V.B. Whitehead) (1♂, SAMC), 15.xi.1975 (V.B. Whitehead) malaise trap (1♂, SAMC), 17.xi.1975 (V.B. Whitehead) malaise trap (2♂, SAMC), 20.xi.1975 (V.B. Whitehead) (1♂, SAMC); Lüderitz Distr., Boomrivier, 28°00'S 17°03'E, 11-12.xi.1992 (Huns Exp. 92) (4♂, SMWH); Lüderitz Distr., Boomrivier, 28°01'S 17°04'E, 13-26.xi.1992 (E. Marais) Pres. pitfall trap (E. Marais) (2♂, SMWH); Karasburg Distr., Velloorsdrif 93, 28°45'S 19°15'E, 7-8.xi.1972 (E. Marais) (1♂, SMWH); Henkries Valley, 28°57'S 18°07'E, 11.x.1980 (Whitehead) (1♂, SAMC); Jackalswater, 29°49'S 22°53'E, vi.1938 (R. Smithers) (3♂, SAMC). SOUTH AFRICA: Cape (279, 37) *det.* as *T. thisbe* (1♂, SAMC); Messina, 22°21'S 30°03'E, xii.1918 (R.W. Tucker) (1♂, SAMC); Messina Nature Res., 554 m, 22°22'S 30°02'E, 11-12.ii.1985 (M.W. Mansell) (2♂, NCSA); Kruger Nat. Park, Lanner Gorge, 402 m, 22°27'S 31°08'E, 23.i.1985 (N.C. Pienaar) (1♂, NCSA); Lapalala Nat. Res., 23°51'S 28°17'E, 21-23.i.1987 (R.B. Kimsey) (1♂, UCDC); Ellisras Dist., Mogol Nature Reserve, 23°58'S 27°45'E, 25-26.i.1982 (M.W. Mansell) (1♂, NCSA), 27-29.ii.1984 (C.D. Eardley) malaise trap (2♂, NCSA), 3.xii.1985 (J.S. Donaldson) malaise trap (1♂, NCSA); Ellisras District, D`Nyala Nat. Res., 23°45'S

27°49'E, 23-26.ii.1987 (M.W. Mansell) collected at light (3♂, NCSA); Richtersveld, Rosyntjiesberg, 28°15'S 17°10'E, 11.x.1974 (M. Mansell) light trap, hot still night (1♂, DJBC); Numeesmyn, 28°17'S 16°58'E, 1.x.1988 (J. Irish & E. Marais) (1♂, SMWH); Numees Mine, 28°18'S 16°58'E, 16-20.ii.1979 (Lamoral, Bampton & Barnley) (1♂, DJBC); Richtersveld National Park, Potjiespram, 28°18'S 16°58'E, 29.i.1995 (P.S. Bayliss) light trap (15♂, DJBC); Annisfontein, 28°25'S 16°53'E, 18-23.xi.1975 (H31950) (5♂, SMWH); Richtersveld, Annisfontein, 28°25'S 16°53'E, 20.xi.1975 (V.B. Whitehead) (1♂, SAMC); Vioolsdrif, 28°50'S 17°39'E, 6-10.viii.1961 (Van Son & Vari) (1♂, TMSA); Pofadder, 2 km N, 29°05'S 19°24'E, 16.iii.1988 (J. Irish & E. Marais) (1♂, SMWH); Pofadder, 29°09'S 19°27'E, 25-26.ii.1933 (G. van Son) (9♂, TMSA); Korasberg, 29°32'S 18°20'E, vii.1936 (Mus. staff) (1♂, SAMC); Williston, 8 km s., 31°20'S 20°52'E, 27.ii.1974 (Ashley B. Gurney) Bushmanland scrub, *det.* by Brothers probably as *T. thisbe* Pér. (1♂, NMNH); Vanrhynsdorp, 31°37'S 18°44'E, xi.1936 (Mus. staff) (1♂, SAMC); Abrahamskraal, 33°13'S 18°08'E, viii.1917 (Mrs V. d. Bijl) (1♂, SAMC); Prince Albert, 33°15'S 22°03'E, 26.xi-4.xii.1931 (R.E. Turner, Brit. Mus. 1932-3) (1♂, NHML), xi.1931 (R.E. Turner, Brit. Mus. 1932-3) (2♂, NHML); Prince Albert, 20 km NE Tierberg Farm, 33°15'S 22°03'E, 15.i.1995 (P.S. Bayliss, J. Kotze & H. Adie) light trap (2♂, DJBC).

DISTRIBUTION

This species occurs in southern Africa, with specimens recorded from southern Angola, Namibia, and northern and southwestern South Africa (fig. 95).

DISCUSSION

Péringuey (1898) includes *T. thisbe* in a key and provides a very brief description based on "[MALE] ... 8-11½ mm ... Cape Colony (Carnarvon, Namaqualand)"; the description is based on at least two specimens. Péringuey makes particular mention of coloration and general body shape which can be used for identifying *T. thisbe*. Péringuey mentions the habitat from where the types were collected but does not provide the date or the collector. It is, therefore, almost impossible from the information provided about the type specimens, to recognize them.

There is a single male (about 8 mm long from Van Wyksvlei) with Péringuey's type label, another (about the same size) with identical collecting data and Péringuey's determination label (*Tricholabiodes thysbe* [*sic*] "sec. typ."), and a third (about 11 mm long from "Namaqualand, Bushmanland vi.1894") without any determination label (excluding the determination label by Brothers). None of these specimens agrees entirely with Péringuey's brief comparative description. Brothers (MS) considers these to be syntypes of *T. thisbe*. Brothers designated the specimen with Péringuey's type label as the

lectotype because he thought it agrees slightly better with the description, "having the third metasomal segment entirely dark as specified (but with the following segments also darkened although not quite as much), in contrast to the entirely pale testaceous metasoma with darkened apical margins of the first and second terga in the other specimen". The specimen Brothers designated as the lectotype does have a later label by Péringuey indicating it as a variety of *T. thisbe*. Brothers (MS) acknowledged that the specimens are not all conspecific; the one from Namaqualand is morphologically different from the other two.

André (1901), in correcting Péringuey's description of *T. semele*, makes brief mention of *T. thisbe*, stating that the error Péringuey made in describing *T. semele*, regarding wing venation, also applies to *T. thisbe*, since *T. thisbe's* description was a comparative description. André stated that he did not know *T. thisbe*, therefore, it can be assumed he had seen no specimens of *T. thisbe*.

André (1902) provides a general description of *Tricholabiodes*. At the end of the description André provides a list of species of *Tricholabiodes* known and their geographical location. *Tricholabiodes thisbe* is one of the species listed, stating that it occurs was collected in the Cape Colony. This information was most probably obtained from Péringueys description.

Bischoff (1920) includes *T. thisbe* in a key and briefly discusses the species while describing the genus *Tricholabiodes*. He makes particular reference to the second flagellomere segment. According to Bischoff, the second flagellomere has at its base a more or less pronounced ring of setae which can often mislead one into thinking that it is an extra segment. This is incorrect, since only the first flagellomere segment has a pronounced ring of setae at its base. Bischoff provides a brief description of *T. thisbe*, based on 14 males, [4]"... the 14 males of the species are predominantly found in Namibia ... recognizable of the species is the coloration, yellowish-brown ... second tergite at apex black and entire third tergite black ... wings are pale yellowish to hazy ... apices of wings have a dark patch which seldom reaches the tips of the wings ... dark patch is least defined in the specimen from the Cape .... because of uniqueness in coloration, this species cannot be confused with other species, and therefore no need to describe other morphological characters". Bischoff could not decide, based on the then available material, whether there are certain races because of the slight observable differences in the intensity of the patches on the wing. Bischoff, in generating the description of *T. thisbe*, did not examine any type specimens but relied on his interpretation of Péringuey's rather poor description. According to Brothers

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[4] This is a direct English translation from the original German (Bischoff 1920).

(MS) the lectotype and the topotypic paralectotype key out to *T. semistriataeformis* Bischoff in Bischoff's key and agree with the very brief description of *T. semistriataeformis*; the other paralectotype (from Namaqualand) does not key out successfully at all (Brothers, MS). It is thus apparent that Bischoff misidentified this species. I have seen no specimens with Bischoff's identification label attached but agree with Brothers's conclusions

The specimens Bischoff (1920) refers to when describing *T. thisbe* could actually be *T. carinifer*, *T. convexus* or *T. longicarinatus* since specimens from these three species, according to Bischoff's key, key out as *T. thisbe* and agree with Bischoff's rather brief description. The one paralectotype, from Namaqualand, has been identified as *T. thisboides*.

Tricholabiodes thisbe is most similar to *T. carinifer*, as well as *T. convexus* and *T. longicarinatus*. Refer to the discussion following the redescription of *T. carinifer* for the most distinguishable differences between these four species.

***Tricholabiodes thisboides* sp. nov. ♂**

Mutilla thisbe, Péringuey, 1898:45, 86 (in part). ♂
Mutilla thisbe Péringuey; Brothers (MS) (in part). ♂

DIAGNOSIS

MALE: Metasoma entirely pale to medium yellowish-brown except for narrow dark yellowish-brown to pale reddish-brown band at apex of T1 and apex of T2. Head with sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with scrobal carina arcuate, not reaching scrobal tubercle. Free border of clypeus strongly convex with a rounded tubercle on each side of midline, distance between tubercle and size of tubercle variable. Middle and inner mandibular teeth adjacent. Dorsellum with dense fine punctation, laterally ridged. Mesepisternum with scrobe and mesepisternal groove present. Mesosternum with no mesosternal processes. Forewing with 2nd submarginal cell sessile anteriorly. Mesal margin of metacoxa simple, edges of mesal punctures may give the impression of a slight carina. Metasoma with anterior one-third of T2 with dense coarse punctation, interspaces narrower than puncture diameter; anterior mesal area of S2 with slight carina < 0.5 X length of sternum, S2 without felt line. Posterior margin of hypopygium convex. Genitalia as in fig. 51.

DESCRIPTION

MALE: Length 12.68 (7.24-13.05, mean 10.96) mm. Head pale to medium yellowish-brown; clypeus and antenna pale yellowish-brown; mandible almost entirely pale yellowish-brown, apex black, ventral tooth dark yellowish-brown to pale reddish-black; mesosoma pale to medium yellowish-brown; legs, including coxae and tibial spurs, pale yellowish-brown; forewing lightly infuscated posterior to marginal cell; pterostigma and wing veins pale yellowish-brown; metasoma entirely pale to medium yellowish-brown except for narrow dark yellowish-brown to pale reddish-brown band at apex of T1 and T2; entire body covered with pallid setae.

Head 1.49 (1.47-1.70, mean 1.54) X as wide as long, 0.98 (0.93-1.07, mean 0.99) X as wide as mesosoma, 1.60 (1.50-1.76, mean 1.61) X as wide as vertex, 1.39 (1.35-1.62, mean 1.44) X as long as compound eye, sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with sparse fine punctation, interspaces shiny and wider than puncture diameter; foveola deep; surface between median ocellus and foveola smooth, slightly longitudinal depressed, between toruli longitudinal median groove deep; scrobal carina arcuate, extending beyond scrobal tubercle almost reaching inner margin of compound eye, anterior half sometimes strongly sclerotised; antennal tubercle simple, shiny, sparsely and finely punctate. Vertex 0.74 (0.72-0.86, mean 0.77) X as long as wide, 1.31 (1.02-1.38, mean 1.21) X as wide as frons; posterior to lateral ocellus with sparse fine punctation, interspaces shiny and wider than puncture diameter. Compound eye with ommatidia distinct. Ocelli large, convex and broadly oval, median ocellus 0.78 (0.78-1.17, mean 1.01) X as long as wide, interocellar distance 1.57 (1.11-2.01, mean 1.38) X ocellocular distance. Gena with sparse fine punctation, interspaces shiny. Clypeus 0.46 (0.37-0.46, mean 0.41) X as high as wide, free border strongly convex with a rounded tubercle on each side of midline, distance between tubercle and size of tubercle variable; central portion raised and slightly convex, with sparse, fine to medium punctation, interspaces 2 X puncture diameter; vestiture length longer than height of clypeus. Mandible higher than thick, dorsal rim with carina along entire length, ending at base of inner tooth, carina more pronounced at apex; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth adjacent, inner tooth subrounded; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 0.96 (0.81-1.04, mean 0.90) X height at base. Antenna with scape 1.57 (1.55-2.22, mean 1.71) X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere simple; second flagellomere 1.38 (1.30-1.85, mean 1.48) X length of first, 1.00 (0.89-1.43, mean 0.98) X length of third.

Mesosoma, excluding anterior collar, 1.73 (1.61-1.87, mean 1.75) X as long as wide. Pronotum 0.90 (0.82-0.93, mean 0.88) X as wide as mesosoma, anterodorsal surface mesally irregular with dense medium ill-defined punctation becoming shallow pit-like reticulation laterally, strongly convex, humeral angle subrounded; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct and almost as large as a reticulation; posterior portion of lateral surface with sparse fine punctation, interspaces irregular and wider than puncture diameter, posterior margin impunctate. Mesoscutum 0.78 (0.69-0.82, mean 0.77) X as long as wide, 0.87 (0.85-0.93, mean 0.89) X as wide as pronotum; entirely with moderate medium punctation, interspaces irregular and subequal to puncture diameter, posterolaterally with dense coarse punctation; posterolateral corner raised as an angulate tooth. Scutellum subsquare, entire dorsal surface densely covered with subcircular coarse punctation. Dorsellum irregular, laterally ridged. Propodeum with areola longer than neighbouring areae. Mesepisternum, anterior to mesepisternal groove with sparse medium punctation, punctures increasing in size and density posteriorly becoming shallow pit-like reticulations, posterior to mesepisternal groove with pit-like, shallow reticulations, reticulations approximately same size as those on anterior portion of lateral surface of pronotum, scrobe a distinct subcircular depression, mesepisternal groove present but sometimes indistinct. Mesosternum with anterior concavity nearly impunctate, shiny, posteriorly sparsely becoming moderately punctate, punctures fine; no mesosternal processes.

Forewing: Pterostigma 0.49 (0.45-0.75, mean 0.60) X length of anterior margin of marginal cell. Marginal cell 3.28 (3.25-3.84, mean 3.59) X as long as wide, 1.56 (1.35-1.86, mean 1.44) X length of second submarginal. Second submarginal cell sessile anteriorly, 0.43 (0.31-0.66, mean 0.49) X length of discoidal cell. Third submarginal cell with vein 3r-m tubular anterior to junction with accessory vein, nebulous becoming spectral posterior to junction with accessory vein; medial vein spectral; accessory vein nebulous, 1.45 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur simple with greatest width at midlength; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.77 (0.69-0.88, mean 0.76) X length of longer spur, longer spur almost straight; basitarsus straight. Hind leg: Coxa entirely with sparse punctation, interspaces wider than puncture diameter, mesal margin simple, edges of mesal punctures may give the impression of a slight carina, ventral surface convex; trochanter simple; femur with macrosetae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae mostly on posterior surface with several setae anteriorly, shorter than shorter spur, shorter spur 0.72 (0.68-0.75, mean 0.71) X length of longer spur, longer spur almost straight, 0.73 (0.59-0.82, mean 0.69) X length of basitarsus; basitarsus with dense microsetae, macrosetae absent, ventral surface with three, often indistinct, rows

of short spines.

Metasoma 1.41 (1.15-1.56, mean 1.41) X as long as wide. First segment moderately narrow and fairly long, slightly constricted at apex, 2.60 (2.00-2.62, mean 2.23) X as long as wide, 2.92 (2.55-2.98, mean 2.70) X as long as high, 1.13 (0.98-1.20, mean 1.10) X as long as T2; tergum, except tergulum, with dense coarse ill-defined punctation, tergulum with moderate fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum anteriorly with moderate fine punctation becoming densely and coarsely punctate posteriorly, median carina interrupted. T2 0.96 (0.96-1.12, mean 1.00) X as long as wide, 0.98 (0.95-1.04, mean 1.01) X as wide as mesosoma, vestiture subdecumbent to suberect, anterior one-third with dense, medium to coarse punctation, interspaces shiny and narrower than puncture diameter, posterior two-thirds shallowly and moderately punctate, punctures decreasing in size posteriorly, interspaces shiny and subequal to puncture diameter, felt line 0.49 (0.43-0.53, mean 0.46) X length of tergum, length anterior to felt line 1.27 (1.07-1.50, mean 1.26) X length of tergum posterior to felt line; S2 convex, setae evenly distributed and shorter than shorter mesotibial spur, anteriorly with dense, medium to coarse punctation, interspaces shiny and narrower than puncture diameter, mesal area with slight carina, < 0.5 X length of sternum, posteriorly with moderate, fine to medium punctation, interspaces shiny, anterolateral margin with slight elongate protuberance, felt line absent. Pygidium with posterior margin slightly convex, almost subsquare, anterior one-third sparsely and finely punctate, interspaces wider than puncture diameter, pygidial plate anteriorly smooth, sometimes slightly irregular, posteriorly with dense fine punctation; hypopygium with posterior margin convex, mesal area simple. Genitalia as in fig. 51.

FEMALE: Unknown.

MATERIAL EXAMINED

TYPE MATERIAL. Holotype: ♂, "Namaqual.[and; 29°00'S 17°00'E] / (Bushmanl.[and]) // Alston / 6.[18]94"; PARALECTOTYPE / *Mutilla* / *thisbe* ♂ / Péringuey 1898 / det. D.J. Brothers, 1982"; "not *Tricholabiodes* / *thisbe* / (Péringuey) / det. D.J. Brothers, 1982"; "SAM-HYM-AO18419" (SAMC). Measured paratypes: 13♂: ANGOLA: [8]Maluila, 15°37'S 13°07'E, 22-23.xi.1974 (H23316) (1♂, SMWH), [9]H23317 (1♂, SMWH). NAMIBIA: [1, 2, 3]Omatjenguma, 8 km NE., 17°58'S 12°21'E, 22-25.xi.1970 (H2565) (3♂, SMWH); [5]Sanitats, 18°18'S 12°51'E, 25-26.x.1970 (H2566) (1♂, SMWH); [12]Otjiwarongo, 20°29'S 16°36'E, 17-22.xi.1970 (H2567) (1♂, SMWH); [13]Usakos, 21°58'S 15°35'E, 22.ii. (G.D. Butler) (1♂, NCSA); [10]Gobabeb, 23°33'S 15°05'E, 16.ii.1988 (C.D. Eardley) light trap (1♂, DJBC), [11]18.ii.1988 (C.D. Eardley) light trap (1♂, DJBC), [4]22.ii.1988 (C.D. Eardley) light trap (1♂,

DJBC); [7]Helmeringhausen, 25°54'S 16°51'E, 5.iii.1987 (R. Oberprieler) light trap (1♂, NCSA); [6, 9](W1) Nr. Onseepkans, Orange R. banks, 28°48'S 19°13'E, 8-10.i.1972 (Southern African Exp., B.M. 1972-1) (2♂, NHML).

Additional paratypes: 355♂: ANGOLA: (A15) Mocámedes, 10 mls NE., 15°10'S 12°09'E, 27-29.ii.1972 (R. Giraul, southern African Exp., B.M. 1972-1) (1♂, NHML); Maluila, 15°37'S 13°07'E, 22-23.xi.1974 (H23317) (3♂, SMWH); Manaculama, 16°S 12°E, 4.x.1969 (H2568) (1♂, SMWH). NAMIBIA: Otjinhungwa, 17°16'S 12°26'E, 17-22.xi.1970 (H2567) (5♂, SMWH); Omatjenguma, 8 km NE, 17°58'S 12°21'E, 22-25.xi.1970 (H2565) (18♂, SMWH); Kaokoland, Orupembe, 18°11'S 12°31'E, 16-17.viii.1973 (H13503) (2♂, SMWH); Kaokoland, Orumana 4 km E., 18°14'S 13°50'E, 24.ii.1990 (E. Marais & J. Irish) (2♂, SMWH); Kaokoland, Orumana 8 km E., 18°14'S 13°50'E, 25.ii.1990 (E. Marais & J. Irish) (1♂, SMWH); Sanitatas, 18°18'S 12°51'E, 25-26.xi.1970 (H2566) (4♂, SMWH); Kaokoland, Okumutati, 18°52'S 14°21'E, 18-19.ii.1985 (J. Irish & H. Rust, H63777) (1♂, SMWH); Kaross, 19°30'S 14°20'E, ii.1925 (Mus. Exped.) (1♂, SAMC); (W37) Otjitambi Fm., 27 mls. ESE Kamanjab, 19°49'S 15°10'E, 13-15.ii.1972 (Southern African Exp., B.M. 1972-1) (3♂, NHML); Outjo, Bethanis 514, 20°24'S 14°24'E, 8-10.v.1973 (H12737) (1♂, SMWH); Damaraland, Bethanis 514, 20°24'S 14°24'E, 12-14.v.1978 (S. Louw & M.-L. Penrith, H36060) (6♂, SMWH); Damaraland, Verbrande Berg, 20°36'S 14°25'E, 12.iv.1987 (E. Marais & J. Irish) (1♂, SMWH); Brandberg, 40 km W. Uis, 21°08'S 14°35'E, 1-2.iii.1994 (P.S. Bayliss) light trap (26♂, DJBC); Uis, 21°08'S 14°49'E, ii.1978 (C. Kok & S.J. v. Tonder) *det.* as *Tricholabiodes* (1♂, NCSA); Omaruru, 21°28'S 15°56'E, 3.iii.1995 (P.S. Bayliss) light trap (2♂, DJBC); Amieb Game Res., 21°45'S 15°38'E, 22.ii.1988 (G.D. Butler) (2♂, NCSA); Gross, Spitzkoppe, 21°50'S 15°11'E, 6-7.v.1995 (H.G. Robertson) at light (1♂, SAMC); Usakos, 21°58'S 15°35'E, 22.ii. (G.D. Butler) (8♂, NCSA); Karibib, Donkerhuk, 21°59'S 15°51'E, 22.ix.1971 (H4269) (1♂, SMWH); Karibib, Noab 69, 22°08'S 15°34'E, 14-15.i.1975 (H29290) (1♂, SMWH), (H29291) (1♂, SMWH), (H29292) (1♂, SMWH); Karibib, Lievenberg 25, 22°19'S 16°18'E, 3-9.xi.1972 (H10363) (1♂, SMWH); Karibib Dist., 47 km S. Wilhemstal, Okandukaseibe Farm No. 27, 22°20'S 16°21'E, 2.xi.1972 (C.L. Hogue) (2♂, UCRC), 10.xi.1972 (C.L. Hogue) (4♂, UCRC); Damaraland, 6 km N. Arandis, 22°22'S 14°59'E, 11.iii.-9.iv.1985 (J. Irish & H. Rust, H63015) (3♂, SMWH); Swakopmund Dist., Rössing Mine, 22°28'S 15°02'E, 11.iii-9.iv.1985 (J. Irish & H. Rust, H62692) (1♂, SMWH); Swakopmund Dist., Lower Dome Gorge, 22°28'S 15°04'E, 8.v-5.vi.1984 (J. Irish & H. Liessner, H59333) (1♂, SMWH), 23.x-20.xi.1984 (J. Irish & H. Liessner, H61310) (2♂,SMWH), 20.xi-18.xii.1984 (J. Irish & H. Liessner, H61646) (1♂, SMWH), 11.iii-9.iv.1985 (J. Irish & H. Rust, H62720) (2♂, SMWH), 9.iv-6.v.1985 (J. Irish & H. Rust, H63169) (3♂, SMWH); Swakopmund Dist., Upper Ostrich Gorge, 22°29'S 14°59'E, 11.iii-9.iv.1985 (J. Irish & H. Rust, H62644) (1♂, SMWH), 9.iv-6.v.1985 (J. Irish & H. Rust, H62856) (1♂, SMWH); Swakopmund

Dist., Upper Panner Gorge, 22°29'S 15°01'E, 8.v-5.vi.1984 (J. Irish & H. Liessner, H59567) (2♂, SMWH), 12.ii-11.iii.1985 (J. Irish & H. Rust, H62422) (1♂, SMWH), 9.iv-6.v.1985 (J. Irish & H. Rust, H63064) (6♂, SMWH); Swakopmund Dist., Lower Ostrich Gorge, 22°30'S 14°58'E, 8.v-5.vi.1984 (J. Irish & H. Liessner, H59426) (2♂, SMWH), 9.iv-6.v.1985 (J. Irish & H. Rust, H62944) (5♂, SMWH); Namib-Naukluft Park, NE corner at: 22°38'S 15°33'E, 18.v.1990 (J. Irish & E. Marais) (3♂, SMWH); Swakopmund, 40 mi. E., 1200 m, 22°40'S 14°34'E, 24.xii.1966 (E.S. Ross & E. Lorenzen) (3♂, CASC); Windhoek Dist., 110 km E Windhoek, Arnhem Farm No. 222, 22°41'S 18°08'E, 25.x.1972 (C.L. Hogue) (1♂, UCRC); Windhoek, Wasservallei 382, 22°55'S 16°22'E, 21-23.xii.1973 (H16284) (1♂, SMWH); Windhoek, Wasservallei (W) at 22°55'S 16°22'E, 20-23.xii.1974 (H28583) (1♂, SMWH); Namib/Naukluft Park, Ganab, 23°06'S 15°33'E, 16.iii.1983 (C.D. Eardley) light trap (3♂, NCSA); (22) Kuiseb Canyon, 23°18'S 15°45'E, 22-23.i.1972 (Southern African Exp., B.M. 1972-1) (33♂, NHML); (W22) Kuiseb river canyon, 23°22'S 15°40'E, 22-23.i.1972 (Southern African Exp., B.M. 1972-1) Riverside vegetation (1♂, NHML); Namib Naukluft Park, 23°24'S 15°03'E, xi.1989 (M. Nel) light trap in Kuiseb River (1♂, SMWH); Gobabeb, 408 m, 23°30'S 15°00'S (1♂, TMSA); Gobabeb, Kuiseb R., 23°33'S 15°02'E, 4.i.1988 (C.D. Eardley) light trap (4♂, DJBC), 6.i.1988 (C.D. Eardley) light trap (1♂, DJBC), 11.i.1988 (C.D. Eardley) light trap (6♂, DJBC), 8.ii.1988 (C.D. Eardley) light trap (2♂, DJBC), 16.ii.1988 (C.D. Eardley) light trap (2♂, SMWH), 22.ii.1988 (C.D. Eardley) light trap (1♂, DJBC), 27.ii.1988 (C.D. Eardley) light trap (6♂, DJBC); Gobabeb, 23°33'S 15°02'E, 5.i.1988 (C.D. Eardley) light trap (3♂, DJBC), 10.i.1988 (C.D. Eardley) light trap (7♂, DJBC), 30.i.1988 (C.D. Eardley) light trap (1♂, DJBC), 7.ii.1988 (C.D. Eardley) light trap (2♂, DJBC), 10.ii.1988 (C.D. Eardley) light trap (1♂, DJBC), 11.ii.1988 (C.D. Eardley) light trap (1♂, DJBC), 12.ii.1988 (C.D. Eardley) light trap (7♂, DJBC),16.ii.1988 (C.D. Eardley) light trap (2♂, DJBC), 19.ii.1988 (C.D. Eardley) light trap (5♂, DJBC), 20.ii.1988 (C.D. Eardley) light trap (4♂, DJBC), 22.ii.1988 (C.D. Eardley) light trap (5♂, DJBC), 23.ii.1988 (C.D. Eardley) light trap (2♂, DJBC), 24.ii.1988 (C.D. Eardley) light trap (4♂, DJBC), 26.ii.1988 (C.D. Eardley) light trap (1♂, DJBC), 27.ii.1988 (C.D. Eardley) light trap (1♂, DJBC), 28.ii.1988 (C.D. Eardley) light trap (1♂, DJBC), 29.ii.1988 (C.D. Eardley) light trap (1♂, DJBC); Namib-Naukluft Park, Gobabeb, along Kuiseb River, 23°33'S 15°02'E, 27.i.1995 (P.S. Bayliss) light trap (6♂, DJBC), 21.ii.1995 (P.S. Bayliss) light trap (1♂, DJBC); Gobabeb, 23°33'S 15°05'E, 2.iv.1966 (1♂, TMSA); Gobabeb, 23°33'S 15°05'E, 10.ii.1978 (O. Lomholdt) Kuiseb River flowing, *det.* by Petersen as *T. livida* ?? (1♂, UCRC); Namib-Naukluft Park, along Kuiseb River, 23°33'S 15°05'E, 9.ii.1995 (P.S. Bayliss) light trap (2♂, DJBC), 11.ii.1995 (P.S. Bayliss) light trap (14♂, DJBC), 14.ii.1995 (P.S. Bayliss) light trap (5♂, DJBC); Namib/Naukluft Park, Kuiseb R nr Gobabeb, 23°34'S 15°03'E, 18.ii-20.iii.1983 (Nat. Coll. Kuiseb Survey) malaise trap (15♂, NHML), 18.ii-20.iii.1983 (Nat. Coll. Kuiseb Survey) (4♂, NHML); (23)

Homeb, 10 mls. ESE. Gobabeb, 23°38'S 15°30'E, 23-25.i.1972 (Southern African Exp., B.M. 1972-1) (1♂, NHML); Namib-Naukluft Park, Homeb, 23°38'S 15°30'E, 20.ii.1988 (G.D. Butler) (3♂, NCSA), 20.ii.1988 (M.W. Mansell) (1♂, NCSA); Namib-Naukluft Park, Homeb, 23°38'S 15°11'E, 23.ii.1995 (P.S. Bayliss) light trap (1♂, SMWH); Rehoboth Dist., 6 m. SSW. Solitaire, 23°53'S 16°00'E, 1.v.1969 (H.D. Brown) (1♂, NCSA); Maltahöhe Dist., Blässkranz 7 at: 24°05'05"S 16°14'05"E, 12-14.x.1984 (J. Irish, H61847) (1♂, SMWH); Maltahöhe Dist., De Valle 226 at: 24°08'S 16°05'E, 10-12.x.1984 (J. Irish, H61582) (3♂, SMWH); Mariental District, Chulon, Narib Ost 602, 24°10'S 17°42'E, 30.v-5.vii.1982 (M.-L. Penrith, H58295) Preser. traps, dune (1♂, SMWH); Naukluft, 1300-1500 m., 24°15'S 16°14'E, 7-10.xii.1933 (K. Jordan) (1♂, NHML); Naukluft Park, Ubusis 3, 24°21'S 16°07'E, 18-19.ii.1984 (J. Irish, H60212) (1♂, SMWH); Karibib, Bethel 89, 24°27'S 19°53'E, 2-3.xi.1974, (H21630) (1♂, SMWH), (H21632) (1♂, SMWH); Maltahöhe, Sesriem 137, 24°29'S 15°48'E, 5-8.iv.1972 (H7431) (1♂, SMWH); (19) Sesriem Canyon, 3 mls. W. Sesriem, 24°31'S 15°46'E, 21-22.i.1972 (Southern African Exp., B.M. 1972-1) general sweeping (3♂, NHML); Mariental, 24°36'S 17°59'E, 28.xii.1978 (Empey) (1♂, DJBC); Mariental, 60 km S., 24°40'S 17°59'E, 2.ii.1995 (P.S. Bayliss) light trap (1♂, DJBC); (13) Barby Farm, 25 mls. W. Helmeringhausen, 25°51'S 16°33'E, 17-18.i.1972 (Southern African Exp., B.M. 1972-1) (1♂, NHML); Bethanie, Barby 26, 25°51'S 16°33'E, 2-7.x.1972 (H9235) (1♂, SMWH); Helmeringhausen, 25°54'S 16°51'E, 5.iii.1987 (R. Oberprieler) light trap (3♂, NCSA); Bethanie Dist., 25 km WNW. Helmeringhausen, Barby Farm No. 26, 25°55'S 16°37'E, 8.x.1972 (C.L. Hogue) (1♂, UCRC); Namib-Naukluft Prk, Naukluft Camp site, 26°16'S 16°15'E, 6.iii.1987 (R. Oberprieler) light trap (2♂, NCSA); Seeheim, 26°50'S 17°45'E, 16.ii.1934 (J. Ogilvie, B.M. 1934-148) (1♂, NHML); Keetmanshoop, Swartbaas West 276, 27°01'S 19°42'E, 19-22.iv.1972 (H7832) (1♂, SMWH); Fish River Canyon, Hobas Camp, 27°40'S 17°45'E, 1.ii.1995 (P.S. Bayliss) light trap (7♂, DJBC); Bethanien District, Churutabis 108, 27°27'S 17°25'E, 22.xi.1992 (Huns Exp 92) (1♂, SMWH); Bethanien, Churutabis 108, 27°29'S 17°28'E, 4-12.x.1974 (H20971) (1♂, SMWH); Warmbad Dist., Hobas 374, 27°37'S 17°43'E, 19.i-16.ii.1985 (J. Le Roux, H64026) (1♂, SMWH); Outjo District, Buschmannberg, 234, 27°46'S 16°24'E, 19.ii.1990 (J. Irish & E. Marais) (1♂, SMWH); Namaskluft, Rosh Pinah, 27°57'S 16°46'E, 15.xi.1975 (V.B. Whitehead) malaise trap (1♂, SAMC); Lüderitz Distr., Boomsrivier, 28°00'S 17°03'E, 20.xi.1993 (E. Marais) (1♂, DJBC); Warmbad, Ortmansbaum 120, 28°18'S 18°42'E, 18-21.x.1971 (H4693) light at night (1♂, SMWH); Karasburg Distr., Velloorsdrift 93, 28°45'S 19°15'E, 7-8.xi.1992 (E. Marais) (1♂, SMWH); Onseepkans, 28°48'S 19°13'E, 8-9.x.1966 (1♂, SAMC); (W1) Nr. Onseepkans, Orange R. banks, 28°48'S 19°13'E, 8-10.i.1972 (Southern African Exp., B.M. 1972-1) (2♂, NHML). SOUTH AFRICA: Annisfontein, 28°25'S 16°53'E, 18-23.xi.1975 (H31950) (2♂, SMWH); Pofadder, 2 km N., 29°05'S 19°24'E, 16.iii.1988 (J. Irish & E. Marais) (4♂, SMWH); Pofadder, 29°09'S 19°27'E, 26.i.1995 (P.S.

Bayliss) light trap (1♂, DJBC); Prince Albert Rd., 33°15'S 22°03'E, xi.1931 (R.E. Turner, Brit. Mus. 1931-564) (1♂, NHML).

DISTRIBUTION

This species has a broad distribution in southern Africa, with specimens recorded southern Angola, Namibia, and northwestern and southern South Africa (fig. 96).

DISCUSSION

Tricholabiodes thisboides is most similar to *T. alveolus*. These two species can be readily separated from each other by colour. *Tricholabiodes alveolus* has T2 entirely dark reddish-black, while in *T. thisboides* T2 is entirely pale to medium yellow-brown with a narrow dark reddish-black band at the apex. The genitalia (figs 49 & 51) leaves one in no doubt to the identity of these two species.

ETYMOLOGY

"*thisboides*" (L.), having the form of *thisbe*; in reference to the similarity in characters to *T. thisbe*.

Tricholabiodes longicarinatus sp. nov. ♂

[*Tricholabioides* [*sic*]] *thisbe* Péringuey; Bischoff, 1920:101, 102, 103, 104 (misidentification) (?). ♂

DIAGNOSIS

MALE: Metasoma entirely medium yellowish-brown except for narrow black band at apex of T2 and anterior half of T3. Free border of clypeus strongly convex with a rounded tubercle on each side of midline. Middle and inner mandibular tooth adjacent. First flagellomere basally with ring of setae. Mesosoma with anterodorsal surface strongly convex, humeral angle subsquare. Dorsellum laterally ridged. Mesosternum with no mesosternal processes. Forewing with 2nd submarginal cell sessile anteriorly. Mesal margin of metacoxa slightly carinate. Metasoma with setae of S2 evenly distributed and longer than shorter mesotibial spur, mesal area with robust > 0.5 X length of sternum. Genitalia as in fig. 33.

DESCRIPTION

MALE: Length 14.88 (14.53-16.21, mean 15.26) mm. Head, including clypeus and antenna, pale to medium yellowish-brown; mandible almost entirely pale yellowish-brown, apex black, ventral tooth pale

reddish-black; mesosoma medium yellowish-brown; legs, including coxae and tibial spurs, pale yellowish-brown; forewing lightly infuscated posterior to marginal cell; pterostigma and wing veins pale yellowish-brown; metasoma entirely medium yellowish-brown except for narrow black band at apex of T2 and anterior half of T3; entire body, particularly metasoma, covered with pallid setae.

Head 1.43 (1.40-1.47, mean 1.46) X as wide as long, 0.99 (0.92-0.99, mean 0.95) X as wide as mesosoma, 1.62 (1.49-1.62, mean 1.55) X as wide as vertex, 1.50 (1.50-1.55, mean 1.52) X as long as compound eye, sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons anteriorly with sparse fine punctation, interspaces shiny and wider than puncture diameter, posteriorly with moderate medium punctation; foveola deep; surface between median ocellus and foveola smooth, without longitudinal median groove though slightly longitudinally depressed, between toruli longitudinal median groove v-shape in section and deep; scrobal carina arcuate, extending to scrobal tubercle; antennal tubercle simple, sparsely and finely punctate. Vertex 0.76 (0.72-0.76, mean 0.74) X as long as wide, 1.26 (1.26-1.34, mean 1.30) X as wide as frons; posterior to lateral ocellus with sparse fine punctation, interspaces shiny and wider than puncture diameter. Compound eye with ommatidia distinct. Ocelli large, convex and broadly oval, median ocellus 0.77 (0.77-0.86, mean 0.81) X as long as wide, interocellar distance 1.05 (1.05-1.13, mean 1.08) X ocellocular distance. Gena with sparse medium punctation, interspaces slightly irregular. Clypeus 0.42 (0.39-0.42, mean 0.41) X as high as wide, free border strongly convex with a rounded tubercle on each side of midline; central portion raised, mesally with slight longitudinal oval depression, rounded in section, with sparse fine punctation, interspaces 2 X puncture diameter; vestiture length longer than height of clypeus. Mandible higher than thick, dorsal rim with carina along entire length, ending at base of inner tooth; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth adjacent, inner tooth subrounded; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 1.09 (1.08-1.18, mean 1.13) X height at base. Antenna with scape 1.79 (1.64-1.79, mean 1.70) X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere basally with a ring of setae; second flagellomere 1.22 (1.22-1.36, mean 1.30) X length of first, 1.03 (0.99-1.08, mean 1.02) X length of third.

Mesosoma, excluding anterior collar, 1.79 (1.72-1.86, mean 1.79) X as long as wide. Pronotum 0.89 (0.86-0.94, mean 0.90) X as wide as mesosoma, anterodorsal surface mesally irregular with ill-defined punctations becoming pit-like shallow reticulations laterally, strongly convex, humeral angle subsquare; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet small but sometimes

indistinct; posterior portion of lateral surface slightly rough striated, posterior margin impunctate. Mesoscutum 0.86 (0.80-0.86, mean 0.84) X as long as wide, 0.86 (0.84-0.86, mean 0.85) X as wide as pronotum; between notauli with moderate ill-defined punctation, interspaces irregular and subequal to puncture diameter; laterally with moderate, medium to coarse punctation, posterolaterally with dense coarse punctation; posterolateral corner raised as an angulate tooth. Scutellum subsquare, entire dorsal surface densely covered with pit-like reticulations. Dorsellum with dense fine punctation, laterally ridged. Propodeum with areola same length as neighbouring areae. Mesepisternum, anterior to mesepisternal groove with sparse fine punctation becoming coarsely and densely punctate posteriorly, posterior to mesepisternal groove with pit-like, shallow reticulations, reticulations approximately same size as those on anterior portion of lateral surface of pronotum, scrobe a distinct subcircular depression, mesepisternal groove present, reticulations in groove twice as long as wide. Mesosternum with anterior concavity nearly impunctate, shiny, posteriorly becoming moderately to densely punctate, punctures fine and ill-defined; no mesosternal processes.

Forewing: Pterostigma 0.43 (0.41-0.54, mean 0.45) X length of anterior margin of marginal cell. Marginal cell 4.03 (4.03-4.46, mean 4.25) X as long as wide, 1.54 (1.54-1.72, mean 1.61) X length of second submarginal. Second submarginal cell sessile anteriorly, 0.47 (0.45-0.51, mean 0.47) X length of discoidal cell. Third submarginal cell with vein 3r-m, anterior to junction with accessory vein, tubular, posterior to junction with accessory vein, nebulous becoming spectral posteriorly; medial vein spectral; accessory vein nebulous, 1.2 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur simple with greatest width at midlength; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.75 (0.74-0.83, mean 0.79) X length of longer spur, longer spur almost straight; basitarsus straight. Hind leg: Coxa entirely with sparse punctation, interspaces wider than puncture diameter, mesal margin carinate, ventral surface convex; trochanter simple; femur with macrosetae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae only on posterior surface with several setae anteriorly, shorter than shorter spur, shorter spur 0.72 (0.72-0.81, mean 0.76) X length of longer spur, longer spur almost straight, 0.63 (0.53-0.63, mean 0.58) X length of basitarsus; basitarsus with dense microsetae, macrosetae absent, ventral surface with three rows of short stout spines.

Metasoma 1.49 (1.33-1.49, mean 1.41) X as long as wide. First segment narrow, long, slightly constricted at apex, 2.61 (2.58-2.74, mean 2.65) X as long as wide, 2.86 (2.81-2.99, mean 2.87) X as long as high, 1.01 (1.01-1.07, mean 1.03) X as long as T2; tergum, except tergulum, irregular with

sparse to moderate, fine punctation, tergulum with moderate fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum anteriorly with moderate fine punctation with punctures increasing in size posteriorly, median carina interrupted. T2 1.05 (1.02-1.06, mean 1.04) X as long as wide, 1.05 (0.98-1.05, mean 1.01) X as wide as mesosoma, vestiture subdecumbent to suberect, anterior one-third with moderate medium punctation, interspaces shiny and subequal to puncture diameter, posterior two-thirds with moderate, fine to medium punctation, interspaces shiny, felt line 0.53 (0.52-0.61, mean 0.56) X length of tergum, length anterior to felt line 1.07 (0.72-1.07, mean 0.93) X length of tergum posterior to felt line; S2 convex, setae evenly distributed and longer than shorter mesotibial spur, entirely with sparse to moderate, medium punctation, anteriorly punctures ill-defined, posteriorly interspaces shiny and subequal to puncture diameter, mesal area with strong carina > 0.5 X length of sternum, felt line absent. Pygidium with posterior margin strongly convex, anterior one-third moderately to densely punctate, interspaces subequal to puncture diameter, pygidial plate anteriorly smooth with several punctures along the midline, posteriorly with dense fine punctation; hypopygium with posterior margin convex, mesal area simple. Genitalia as in fig. 33.

FEMALE: Unknown.

MATERIAL EXAMINED

TYPE MATERIAL. Holotype: ♂, "SOUTH AFRICA / Richtersveld National / Park, Potjiespram / 28.18S 16.58E / 29.i.1995 P.S. Bayliss / light trap" (SAMC).

Measured paratypes: 3♂: NAMIBIA: [2]Bethanien, Churutabis 108, 27°29'S 17°28'E, 4-12.x.1974 (H20968) (1♂, SMWH); [1]Karasburg, Geiaus 6, 27°40'S 17°44'E, 13-17.x.1974 (H21234) (1♂, SMWH). SOUTH AFRICA: [3]Cape Prov., Richtersveld, Numees Mine, 28°18'S 16°58'E, 16-20.ii.1979 (Lamoral, Bampton & Barnley) (1♂, DJBC).

DISTRIBUTION

This species occurs in southern Africa, with specimens recorded from southern Namibia and the northwesternmost part of South Africa (fig. 97).

DISCUSSION

It is possible, since Bischoff (1920), in redescribing *T. thisbe* did not examine any of the type specimens, misidentified *T. longicarinatus* as *T. thisbe*. Bischoff's interpretation of Péringuey's (1898) description of *T. thisbe* is incorrect. According to Brothers (MS), the lectotype and topotypic paralectotype of *T. thisbe* do not key out as *T. thisbe* in Bischoff's (1920) key, nor agree with his description.

Tricholabiodes longicarinatus (as does *T. carinifer* and *T. convexus)* keys out, using Bischoff's key, as *T. thisbe* and matches Bischoff's redescription.

Tricholabiodes longicarinatus is most similar to *T. carinifer*, as well as *T. convexus* and *T. thisbe*. Refer to the discussion following the redescription of *T. carinifer* for the distinguishable differences between these four species.

ETYMOLOGY

"*longicarinatus*" (L.), long keel; in reference to the long carina on S2.

***Tricholabiodes convexus* sp. nov. ♂**

[*Tricholabioides* [*sic*]] *thisbe* Péringuey; Bischoff, 1920:101, 102, 103, 104 (misidentification) (?). ♂

DIAGNOSIS

MALE: Metasoma with segments T1-T2 entirely medium yellowish-brown with narrow medium reddish-black to black band at apex of each segment, T3 entirely medium to dark reddish-black, rest of metasoma medium yellowish-brown. Head with sides behind eyes subparallel, distinct from weakly convex posterior margin. Frons with foveola absent; surface anterior of median ocellus smooth, slightly longitudinally depressed, scrobal carina present. Free border of clypeus strongly convex with a rounded tubercle on each side of midline. Middle and inner mandibular teeth adjacent. Antenna with first flagellomere with a ring of setae basally. Dorsellum laterally ridged. Mesepisternum with scrobe and mesepisternal groove present. Mesosternum with no mesosternal processes. Forewing with 2nd submarginal cell sessile anteriorly. Posterior half of mesal margin of metacoxa slightly ventrally enlarged and strongly carinate, in cross-section subtriangulate. Metasoma with T2 entirely shallowly and moderately punctate, anteriorly punctation ill-defined, interspaces irregular, posteriorly punctation fine to medium, interspaces shiny and subequal to puncture diameter. Genitalia as in fig. 19.

DESCRIPTION

MALE: Length 16.06 (8.95-16.06, mean 13.85) mm. Head, including clypeus and antenna, pale to medium yellowish-brown, between ocelli dark reddish-black to black; mandible almost entirely pale to medium yellowish-brown, apex black, ventral tooth medium to dark reddish-black; mesosoma pale to medium yellowish-brown; legs, including coxae and tibial spurs, pale yellowish-brown; forewing lightly

infuscated posterior to marginal cell; pterostigma and wing veins pale yellowish-brown; metasoma with T1-T2 entirely medium yellowish-brown with narrow medium reddish-black to black band at apex of each segment, T3 entirely medium to dark reddish-black, rest of metasoma medium yellowish-brown.

Head 1.42 (1.35-1.52, mean 1.45) X as wide as long, 0.91 (0.84-1.03, mean 0.94) X as wide as mesosoma, 1.62 (1.46-1.63, mean 1.57) X as wide as vertex, 1.53 (1.45-1.56, mean 1.50) X as long as compound eye, sides behind compound eyes subparallel, distinct from weakly convex posterior margin. Frons with sparse fine punctation, interspaces shiny and wider than puncture diameter; foveola absent; surface anterior of median ocellus smooth, slightly longitudinally depressed, between toruli longitudinal median groove rounded in section and shallow; scrobal carina arcuate, not reaching scrobal tubercle, which is subcircular; antennal tubercle simple, sparsely and finely punctate. Vertex 0.79 (0.66-1.04, mean 0.75) X as long as wide, 1.26 (1.21-1.41, mean 1.28) X as wide as frons; posterior to lateral ocellus with sparse fine punctation, interspaces shiny and wider than puncture diameter. Compound eye with ommatidia distinct. Ocelli large, convex and broadly oval, median ocellus 0.89 (0.72-0.93, mean 0.85) X as long as wide, interocellar distance 1.01 (0.88-1.41, mean 1.14) X ocellocular distance. Gena with sparse medium punctation, interspaces irregular. Clypeus 0.44 (0.43-0.49, mean 0.45) X as high as wide, free border strongly convex with a rounded tubercle on each side of midline; central portion raised, with a longitudinally oval mesal depression, rounded in section, with sparse fine punctation, interspaces 2-3 X puncture diameter; vestiture length subequal to height of clypeus. Mandible higher than thick, dorsal rim with carina along entire length, ending at base of inner tooth; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth adjacent, inner tooth subrounded; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely subrounded, mandibular height across ventral tooth 0.91 (0.76-0.98, mean 0.88) X height at base. Antenna with scape 1.66 (1.60-1.86, mean 1.70) X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere basally with ring of setae; second flagellomere 1.30 (1.18-1.47, mean 1.32) X length of first, 1.03 (0.97-1.07, mean 1.02) X length of third.

Mesosoma, excluding anterior collar, 1.76 (1.64-1.80, mean 1.73) X as long as wide. Pronotum 0.90 (0.84-0.94, mean 0.89) X as wide as mesosoma, anterodorsal surface mesally irregular with ill-defined punctations becoming pit-like shallow reticulations laterally, slightly convex, humeral angle subrounded; anterior portion of lateral surface with pit-like reticulations, lateral epaulet distinct and almost as large as a reticulation; posterior portion of lateral surface with ill-defined rough striations, posterior margin impunctate. Mesoscutum 0.83 (0.78-0.83, mean 0.80) X as long as wide, 0.86 (0.80-0.96, mean 0.86) X as wide as pronotum; entirely with moderate medium punctation, interspaces smooth and subequal

to puncture diameter; posterolateral corner raised as an angulate tooth. Scutellum subsquare, entire dorsal surface densely covered with coarse punctation. Dorsellum irregular, laterally ridged. Propodeum with areola twice length of neighbouring areae. Mesepisternum, anterior to mesepisternal groove with sparse medium punctation, increasing in density and size posteriorly, becoming densely and coarsely punctate, posterior to mesepisternal groove with pit-like, shallow reticulations, reticulations approximately same size as those on anterior portion of lateral surface of pronotum, scrobe a distinct subcircular depression, mesepisternal groove present, reticulations in groove twice as long as wide. Mesosternum with anterior concavity nearly impunctate, posteriorly with sparse to moderate punctation, punctures fine, often ill-defined, anterior to mid coxa with weak, slight diagonal transverse ridge; no mesosternal processes.

Forewing: Pterostigma 0.65 (0.49-0.84, mean 0.63) X length of anterior margin of marginal cell. Marginal cell 3.55 (3.55-4.36, mean 3.95) X as long as wide, 1.37 (1.35-1.63, mean 1.53) X length of second submarginal. Second submarginal cell sessile anteriorly, 0.44 (0.41-0.49, mean 0.45) X length of discoidal cell. Third submarginal cell with vein 3r-m tubular anterior to junction with accessory vein, nebulous becoming absent posterior to junction with accessory vein; medial vein spectral; accessory vein nebulous, 1.2 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur simple with greatest width at midlength; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.69 (0.57-0.72, mean 0.65) X length of longer spur, longer spur slightly mesally curved; basitarsus straight. Hind leg: Coxa entirely with sparse punctation, interspaces wider than puncture diameter, posterior half of mesal margin slightly ventrally enlarged and strongly carinate, in cross-section subtriangulate; trochanter simple; femur with macrosetae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae sparsely but evenly distributed, shorter than shorter spur, shorter spur 0.64 (0.60-0.69, mean 0.64) X length of longer spur, longer spur almost straight, 0.64 (0.62-0.75, mean 0.68) X length of basitarsus; basitarsus with dense microsetae, macrosetae absent, ventral surface with several indistinct rows of short spines.

Metasoma 1.48 (1.24-1.56, mean 1.40) X as long as wide. First segment narrow, long, slightly constricted at apex, 2.81 (2.43-2.90, mean 2.47) X as long as wide, 3.21 (2.81-3.53, mean 3.12) X as long as high, 1.11 (1.08-1.19, mean 1.13) X as long as T2; tergum, except tergulum, irregular with moderate to dense, coarse punctation, tergulum with moderate fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum anteriorly with moderate fine punctation becoming densely and coarsely punctate posteriorly, median carina interrupted.

T2 1.07 (0.97-1.09, mean 1.02) X as long as wide, 1.00 (0.97-1.06, mean 1.01) X as wide as mesosoma, vestiture sparse, entirely shallowly and moderately punctate, anteriorly punctation ill-defined, interspaces irregular, posteriorly punctation fine to medium, interspaces shiny and subequal to puncture diameter, felt line 0.60 (0.48-0.63, mean 0.54) X length of tergum, length anterior to felt line 0.98 (0.81-1.12, mean 1.00) X length of tergum posterior to felt line; S2 convex, setae evenly distributed and shorter than shorter mesotibial spur, entirely with moderate medium punctation, anteriorly interspaces irregular, posteriorly interspaces shiny and subequal to puncture diameter, anterior mesal area with carina anteriorly bulbous, posteriorly slight, < 0.5 X length of sternum, felt line absent. Pygidium transverse, posterior margin strongly convex, anterior one-third moderately to densely punctate, interspaces smooth and subequal to puncture diameter, pygidial plate entirely smooth, except lateral and posterior margin finely punctured; hypopygium with posterior margin convex, mesal area with longitudinal depression > 0.5 X length of sternum. Genitalia as in fig. 19.

FEMALE: Unknown.

MATERIAL EXAMINED

TYPE MATERIAL. Holotype: ♂, "[NAMIBIA:] South Africa CP / Ameib [= Amieb] Game Res. / 21.45S 15.38E / 22.ii.1988 / G. D. Butler" (NCSA).

Measured paratypes: 19♂:NAMIBIA: [1]D. S.W.-Afrika, 1901 (S.V. Lubbert) *det.* by André as *Tricholabiodes thisbe* Pér. ♂ (1♂, MNHN); [4]Farm Amieb, 21°48'S 15°39'E, 10.iii.1987 (R. Oberprieler) (1♂, NCSA); [8]Usakos, 21°58'S 15°35'E, 22.ii. (G.D. Butler) (1♂, NCSA); [6]Windhoek, 22°34'S 17°06'E, 26.xii.1977 (Empey) (1♂, DJBC); [5]Windhoek, Wasservallei 382, 22°55'S 16°22'E, 21-23.xii.1973 (H16284) (1♂, SMWH); [9, 10]Windhoek, Wasservallei (W) at, 22°55'S 16°22'E, 20-23.xii.1974 (H28583) (2♂, SMWH); [12]Namib Naukluft Park, Ganab, 23°06'S 15°33'E, 16.iii.1983 (C.D. Eardley) light trap (1♂, NCSA); [11]Kuiseb Canyon (22), 23°18'S 15°45'E, 22-23.i.1972 (Southern African Exp., B.M., 1972-1) (1♂, NHML); [19]Maltahöhe, Blässkrantz, 24°04'S 16°17'E 24.x.1968 (H5522) light at night (1♂, SMWH); [18]Maltahöhe District, Blässkrantz 7, 24°04'S 16°17'E, 25.v.1990 (J. Irish, E. Marais) (1♂, SMWH); [17]Maltahöhe District, De Valle 226 at:, 24°08'S 16°05'E, 10-12.x.1984 (J. Irish, H61582) (1♂, SMWH); [13, 14]Namib-Naukluft Park, Ubusis 3, 24°22'S 16°04'E, 11-13.i.1985 (J+E Irish, H63134) (2♂, SMWH); [7]Namaland, Mukorob 14, 25°40'S 18°00'E, 12-14.iv.1974 (18293) (1♂, SMWH); [15]Bethanie Dist., 25 km WNW Helmeringhausen, Barby Farm No. 26, 25°55'S 16°37'E, 9.x.1972 (C.L. Hogue) (1♂, UCRC); [14]Namib-Naukluft Prk, Naukluft Camp site, 26°16'S 16°15'E, 6.iii.1987 (R. Oberprieler) light trap (1♂, NCSA); [2]Aar Farm (11), 25 mls. ESE. Aus, 26°40'S 16°15'E, 15-17.i.1972 (Southern African Exp., B.M. 1972-1) (1♂, NHML); [16]Bethanien, Churutabis

108, 27°29'S 17°28'E, 4-12.x.1974 (H20968) (1♂, SMWH); ^{3}W1, Nr. Onseepkans, Orange River banks, 28°48'S 19°13'E, 8-10.i.1972 (Southern African Exp., B.M. 1972-1) (1♂, NHML).

Additional paratypes: 41♂: NAMIBIA: Amieb Game Res., 21°45'S 15°38'E, 22.ii.1988 (G.D. Butler) (1♂, NCSA); Karibib, Donkerhuk 91, 21°59'S 15°51'E, 23.ix.1971 (H4275) (1♂, SMWH); Amieb Farm (30), 19 mls. NW. Karibib, 21°59'S 15°51'E, 31.I-2.ii.1972 (Southern African Exp., B.M. 1972-1) (1♂, NHML); Karibib, Naob 69, 22°08'S 15°34'E, 14-15.i.1975 (H29291) (1♂, SMWH); Swakopmund, 40 mi. E., 1200 m, 22°40'S 14°34'E, 24.xii.1966 (E.S. Ross & K. Lorenzen) (1♂, CASC); Windhoek, Wasservallei 382, 22°55'S 16°22'E, 21-23.xii.1973 (H16284) (1♂, SMWH); Windhoek, Wasservallei (W) at, 22°55'S 16°22'E, 20-23.xii.1974 (H28583) (3♂, SMWH); Walvis Bay, 22°57'S 14°30'E, 1884 (Wilmer) *det.* as *T. thisbe* var. (1♂, SAMC); Namib Naukluft Park, Ganab, 23°06'S 15°33'E, 16.iii.1983 (C.D. Eardley) light trap (1♂, NCSA), 11.iv.1991 (E. Holm & S. Gussmann) light trap (2♂, SMWH); Djab, 23°09'S 16°03'E, 1.ix.1962 (H880) (1♂, SMWH); Kuiseb Canyon (22), 23°18'S 15°45'E, 22-23.i.1972 (Southern African Exp., B.M., 1972-1) (7♂, NHML); Maltahöhe, Blässkrantz, 24°04'S 16°17'E, 24.x.1968 (H5522) light at night (2♂, SMWH); Maltahöhe Dist., De Valle 226 at:, 24°08'S 16°05'E, 10-12.x.1984 (J. Irish, H61582) (2♂, SMWH); Namaland, Mukorob 14, 25°40'S 18°00'E, 12-14.iv.1974 (18293) (3♂, SMWH); Namib-Naukluft Prk, Naukluft Camp site, 26°16'S 16°15'E, 6.iii.1987 (R. Oberprieler) light trap (4♂, NCSA); Luderitz, Gorasis 99, 26°38'S 15°10'E, 25-31.i.1974 (H16984) (1♂, SMWH); Aus, 26°40'S 16°15'E, 1917 (Dr Kribel) (1♂, SAMC); (11) Aar Farm, 25 mls. ESE. Aus, 26°40'S 16°15'E, 15-17.i.1972 (Southern African Exp., B.M. 1972-1) (6♂, NHML); Bethanien, Churutabis 108, 27°29'S 17°28'E, 4-12.x.1974 (H20968) (1♂, SMWH).

DISTRIBUTION

This species occurs in southern Africa, with specimens recorded only from Namibia (fig. 97).

DISCUSSION

It is possible, since Bischoff (1920), in redescribing *T. thisbe*, did not examine any of the type specimens, misidentified *T. convexus* as *T. thisbe*. Bischoff's interpretation of Péringuey's (1898) description of *T. thisbe* is incorrect. According to Brothers (MS), the lectotype and topotypic paralectotype of *T. thisbe* do not key out as *T. thisbe* in Bischoff's (1920) key, nor agree with his description. *Tricholabiodes convexus* (as does *T. carinifer* and *T. longicarinatus*) keys out, using Bischoff's key, as *T. thisbe* and matches Bischoff's redescription.

Tricholabiodes convexus is most similar to *T. carinifer*, as well as *T. thisbe* and *T. longicarinatus*.

Refer to the discussion following the redescription of *T. carinifer* for the distinguishable differences between these four species.

ETYMOLOGY

"*convexus*" (L.), curved surface, arched towards the observer; in reference to shape of metacoxae.

Tricholabiodes paulocellatus sp. nov. ♂

DIAGNOSIS

MALE: Metasoma with T1 anteriorly medium to dark yellowish-brown, becoming pale to medium reddish-black posteriorly, sternum entirely pale reddish-black, T2-T6 dark reddish-brown, sterna paler than corresponding terga. Head with sides behind compound eyes subparallel, distinct from weakly convex posterior margin. Frons with scrobal carina arcuate, ending midway between scrobal tubercle and compound eye. Ocelli small, ocellocular distance > width of ocelli. Free border of clypeus strongly protruding in an arched, arch mesally notched forming a triangulate protuberance on each side of midline. Middle and inner mandibular teeth adjacent. Mesepisternum with scrobe and mesepisternal groove present. Mesosternum with no mesosternal processes. Forewing with 2nd submarginal cell sessile anteriorly. Mesal margin of metacoxa simple. Metasoma with anterior one-third of T2 with ill-defined longitudinal rectangular reticulations, sparsely and finely punctate within each reticulation; anterior mesal area of S2 with slight carina < 0.5 X length of sternum, S2 without felt line. Genitalia as in fig. 48.

DESCRIPTION

MALE: Length 11.02 (7.94-11.02, mean 9.93) mm. Head, including clypeus and antenna, medium yellowish-brown; mandible almost entirely pale yellowish-brown, apex black, ventral tooth medium reddish-black; mesosoma medium yellowish-brown; legs, including coxae, medium reddish-black, tibial spurs pale yellowish brown; forewing lightly infuscated posterior to pterostigma; pterostigma and wing veins dark yellowish-brown; metasoma with anterior half of T1 medium to dark yellowish-brown becoming pale to medium reddish-black posteriorly, sternum entirely pale reddish-black, T2-T6 dark reddish-brown, sterna paler than corresponding terga; entire body, particularly head and metasoma, covered with long, pallid setae.

Head 1.37 (1.37-1.49, mean 1.44) X as wide as long, 0.86 (0.86-0.93, mean 0.90) X as wide as

mesosoma, 1.32 (1.32-1.41, mean 1.36) X as wide as vertex, 1.86 (1.56-1.86, mean 1.68) X as long as compound eye, sides behind compound eyes subparallel, distinct from weakly convex posterior margin. Frons with sparse fine punctation, interspaces shiny and wider than puncture diameter; foveola deep; surface between median ocellus and foveola smooth, without longitudinal median groove though longitudinally depressed, between toruli longitudinal median groove anteriorly shallow, posteriorly deep; scrobal carina arcuate, ending midway between scrobal tubercle and compound eye; antennal tubercle simple, with sparse fine punctation. Vertex 0.65 (0.58-0.68, mean 0.62) X as long as wide, 1.27 (1.27-1.40, mean 1.35) X as wide as frons; posterior to lateral ocellus with sparse fine punctation, interspaces shiny and wider than puncture diameter. Compound eye with ommatidia distinct. Ocelli small, ocellocular distance > width of ocelli, median ocellus 0.88 (0.77-0.92, mean 0.86) X as long as wide, interocellar distance 0.90 (0.85-1.19, mean 1.01) X ocellocular distance. Gena with dense coarse punctation, sometimes with punctures decreasing in density and size posteriorly, interspaces irregular. Clypeus 0.41 (0.41-0.43, mean 0.42) X as high as wide, free border strongly protruding in an arch, arch mesally notched forming a triangulate protuberance on each side of midline; central portion raised and slightly convex, with sparse fine punctation, interspaces 2 X puncture diameter; vestiture length longer than height of clypeus. Mandible higher than thick, dorsal rim with carina along entire length, ending at base of inner tooth; apex tridentate with apical tooth at least 2 X length of middle tooth, middle and inner teeth adjacent, inner tooth subrounded; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 1.07 (0.94-1.14, mean 1.03) X height at base. Antenna with scape 1.91 (1.73-1.91, mean 1.81) X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere simple; second flagellomere, 1.38 (1.36-1.48, mean 1.39) X length of first, 1.02 (0.94-1.10, mean 1.02) X length of third.

Mesosoma, excluding anterior collar, 1.69 (1.69-1.76, mean 1.71) X as long as wide. Pronotum 0.86 (0.85-0.93, mean 0.88) X as wide as mesosoma, anterodorsal surface with moderate ill-defined punctation mesally, interspaces irregular, becoming pit-like shallow reticulations laterally, slightly convex, humeral angle subsquare, dorsal humeral epaulet small slightly subcircular; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct and almost as large as a reticulation; posterior portion of lateral surface with sparse fine punctation, interspaces irregular and wider than puncture diameter, sometimes rough striated, posterior margin impunctate. Mesoscutum 0.78 (0.74-0.79, mean 0.77) X as long as wide, 0.90 (0.87-0.96, mean 0.90) X as wide as pronotum; between notauli with moderate medium punctation, interspaces irregular and subequal to puncture diameter; laterally moderately punctate, posterolaterally with dense coarse shallow punctation; posterolateral

corner raised as an angulate tooth. Scutellum subsquare, entire dorsal surface densely covered with coarse punctation. Dorsellum irregular, laterally ridged. Propodeum with areola slightly longer than neighbouring areae. Mesepisternum, anterior to mesepisternal groove with moderate fine punctation, increasing in size and density posteriorly, becoming pit-like, shallow reticulations, reticulations approximately same size as those on anterior portion of lateral surface of pronotum, posterior to mesepisternal groove with pit-like, shallow reticulations, scrobe a distinct subcircular depression, mesepisternal groove present, reticulations in groove ill-defined. Mesosternum with anterior concavity nearly impunctate, shiny, posteriorly with moderate medium punctation, punctures ill-defined; no mesosternal processes.

Forewing: Pterostigma 0.74 (0.71-0.96, mean 0.77) X length of anterior margin of marginal cell. Marginal cell 2.99 (2.99-3.31, mean 3.17) X as long as wide, 1.58 (1.47-1.72, mean 1.59) X length of second submarginal. Second submarginal cell sessile anteriorly, 0.40 (0.39-0.43, mean 0.42) X length of discoidal cell. Third submarginal cell with vein 3r-m tubular anterior to junction with accessory vein, nebulous becoming spectral posterior to junction with accessory vein; medial vein spectral; accessory vein anteriorly tubular, posteriorly nebulous, 1.15 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur simple with greatest width at midlength; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.71 (0.68-0.83, mean 0.73) X length of longer spur, longer spur almost straight; basitarsus straight. Hind leg: Coxa entirely with dense medium punctation, interspaces narrower than puncture diameter, mesal margin simple, edges of punctures along mesal margin may give impression of a mesal carina, ventral surface convex; trochanter simple; femur with macrosetae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae sparsely but evenly distributed, shorter than shorter spur, shorter spur 0.62 (0.62-0.81, mean 0.69) X length of longer spur, longer spur almost straight, 0.82 (0.74-0.82, mean 0.78) X length of basitarsus; basitarsus with dense microsetae, macrosetae absent, ventral surface with two, often indistinct, rows of short spines.

Metasoma 1.26 (1.09-1.39, mean 1.27) X as long as wide. First segment moderately narrow and fairly long, slightly constricted at apex, 2.28 (2.28-2.60, mean 2.39) X as long as wide, 2.74 (2.62-2.87, mean 2.76) X as long as high, 1.04 (0.95-1.13, mean 1.03) X as long as T2; tergum, except tergulum, with dense coarse subcircular punctation, tergulum smooth and shiny; sternum anteriorly with sparse fine punctation, interspaces smooth, posteriorly densely and coarsely punctate, mesally simple. T2 1.00 (0.97-1.08, mean 1.01) X as long as wide, 0.98 (0.98-1.04, mean 1.01) X as wide as mesosoma, anterior

one-third with longitudinal ill-defined subrectangular reticulations, sparsely and finely punctate within each reticulation, posterior two-thirds with fine to medium punctation, interspaces shiny and subequal to puncture diameter, felt line 0.50 (0.42-0.50, mean 0.48) X length of tergum, length anterior to felt line 1.31 (1.00-1.67, mean 1.37) X length of tergum posterior to felt line; S2 convex, setae evenly distributed and shorter than shorter mesotibial spur, entirely with moderate medium punctation, interspaces anteriorly irregular, posteriorly smooth and shiny, mesal area with slight carina < 0.5 X length of sternum, felt line absent. Pygidium transverse, margin defined by slightly elevated ridge, posterior margin strongly convex, anterior one-third irregular and moderately to coarsely punctate, pygidial plate anteriorly smooth although surface slightly irregular, posteriorly with sparse coarse punctation; hypopygium with posterior margin convex, mesal area simple. Genitalia as in fig. 48.

FEMALE: Unknown.

MATERIAL EXAMINED

TYPE MATERIAL. Holotype: ♂, "[SOUTH AFRICA:] Willowmore [33°18'S 23°30'E] / Capland / Dr. Brauns. / 15 12 1901"; "*Tricholabioides* [*sic*] / *signatipennis* And. ♂"; "*Tricholabioides* [*sic*] / *signatipennis* André / Transvaal Museum" (TMSA).

Measured paratypes: 3♂: SOUTH AFRICA: [1]Capland, Willowmore, 33°18'S 23°30'E, 15.xii.1901 (1♂), [2]25.xii.1901 (1♂) (Dr. Brauns) *det.* as *Mutilla signatipennis* André, *det.* as *T. signatipennis* André (3♂, SAMC); [3]Cape Province, 5 mi. S.E.E. Oudtshoorn, Klipriver Farm, 33°37'S 22°12'E, 11-13.xi.1972 (van Reenen & Mathabathe) (1♂, TMSA).

Additional paratypes: 2♂: SOUTH AFRICA: Capland, Willowmore, 33°18'S 23°30'E, 15.xii.1901 (1♂), 25.xii.1901 (1♂) (Dr. Brauns) *det.* as *T. signatipennis* André (2♂, TMSA).

DISTRIBUTION

This species occurs in South Africa, with specimens recorded from the southeastern Cape (fig. 98).

DISCUSSION

This species, although very similar to *T. stigmaticus*, *T. andrei* and *T. signatipennis*, is easily recognizable by the small ocelli (ocellocular distance at least 1.50 X width of lateral ocellus). These other three mentioned species each have large ocelli (ocellocular distance less than width of lateral ocellus)..

ETYMOLOGY

"*paulocellatus*" (L.), small, eye; in reference to the small ocelli.

Tricholabioides signatipennis (André, 1901). ♂

Mutilla (Tricholabiodes) signatipennis André, 1901:285. ♂

T. [*richolabiodes*] *signatipennis* André; André, 1902:21. ♂

[*Tricholabioides* [*sic*]] *signatipennis* André; Bischoff, 1920:103, 108. ♂

[*Tricholabioides* [*sic*]] *signatipennis* André; Suárez, 1990:187. ♂

DIAGNOSIS

MALE: Head pale reddish-black, between ocelli darker than surrounding area, to entirely black; legs pale to dark reddish-black; metasoma with T1 entirely medium yellowish-brown except posterior dorsal area pale to dark reddish-black, T2-T6 entirely dark reddish-black to black, lateral areas of all terga and sterna paler than corresponding terga. Head with sides behind compound eyes subparallel, distinct from weakly convex posterior margin. Frons with scrobal carina arcuate, not reaching scrobal tubercle. Free border of clypeus strongly protruding in an arch, arch mesally notched forming a triangular protuberance on each side of midline. Middle and inner mandibular tooth adjacent. Dorsellum laterally ridged. Mesepisternum with scrobe and mesepisternal groove present. Mesosternum with no mesosternal processes. Forewing with 2nd submarginal cell sessile anteriorly. Mesal margin of metacoxa with longitudinal carina 0.5-0.7 X length of coxa. Metasoma with anterior one-third of T2 with longitudinal reticulations, sparsely and finely punctate within each reticulation; anterior mesal area of S2 with strong carina < 0.5 X length of sternum, S2 with felt line. Pygidium with pygidial plate anteriorly smooth although surface slightly irregular, posteriorly with dense fine punctation; posterior margin of hypopygium convex. Genitalia as in fig. 35.

REDESCRIPTION

MALE: Length 9.79 (8.61-14.20, mean 12.02) mm. Head pale reddish-black, between ocelli darker than surrounding area, to entirely black; clypeus medium yellowish-brown; antenna medium to dark yellowish-brown; mandible almost entirely pale yellowish-brown, apex black, ventral tooth medium reddish-black to black; mesosoma medium yellowish-brown; legs, including coxae and tibial spurs, pale to dark reddish-black; forewing lightly infuscated posterior to marginal cell; pterostigma and wing veins pale to dark yellowish-brown; metasoma with T1 entirely medium yellowish brown except distal dorsal

area pale to dark reddish-black, T2-T6 entirely dark reddish-black to black, lateral areas of all terga and sterna paler than corresponding terga; entire body covered in long, pallid setae.

Head 1.51 (1.36-1.67, mean 1.56) X as wide as long, 0.95 (0.83-1.00, mean 0.95) X as wide as mesosoma, 1.46 (1.42-1.64, mean 1.56) X as wide as vertex, 1.68 (1.43-1.80, mean 1.64) X as long as compound eye, sides behind compound eyes subparallel, distinct from weakly convex posterior margin. Frons with sparse fine punctation, interspaces shiny and wider than puncture diameter; foveola deep; surface between median ocellus and foveola without longitudinal median groove, though slightly longitudinally depressed, between toruli longitudinal median groove v-shape in section and deep; scrobal carina arcuate, not reaching scrobal tubercle; antennal tubercle simple, with sparse fine punctation. Vertex 0.62 (0.60-0.77, mean 0.71) X as long as wide, 1.29 (1.12-1.43, mean 1.30) X as wide as frons; posterior to lateral ocellus with moderate fine punctation, interspaces shiny and subequal to puncture diameter. Compound eye with ommatidia distinct. Ocelli large, convex and broadly oval, median ocellus 0.81 (0.61-1.04, mean 0.88) X as long as wide, interocellar distance 1.61 (1.21-2.08, mean 1.67) X ocellocular distance. Gena with sparse medium punctation, interspaces irregular. Clypeus 0.43 (0.35-0.47, mean 0.42) X as high as wide, free border with mesal area strongly protruding in an arch, arch mesally notched forming a triangulate protuberance on each side of midline; central portion raised and slightly convex, median area between tubercles slightly longitudinally depressed, with sparse fine punctation, interspaces 2 X puncture diameter; vestiture length subequal to height of clypeus. Mandible higher than thick, dorsal rim with carina along entire length, ending at base of inner tooth; apex tridentate with apical tooth 2 X length of middle tooth, middle and inner teeth adjacent, inner tooth rounded; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 0.94 (0.78-1.16, mean 0.97) X height at base. Antenna with scape 1.48 (1.30-1.95, mean 1.64) X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere simple; second flagellomere, 1.32 (1.17-1.52, mean 1.35) X length of first, 1.01 (0.93-1.12, mean 1.03) X length of third.

Mesosoma, excluding anterior collar, 1.76 (1.49-1.87, mean 1.79) X as long as wide. Pronotum 0.91 (0.78-0.94, mean 0.93) X as wide as mesosoma, anterodorsal surface irregular mesally becoming pit-like shallow reticulations laterally, strongly convex, humeral angle subrounded; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct and almost as large as a reticulation; posterior portion of lateral surface with sparse fine punctation, interspaces irregular and wider than puncture diameter, posterior margin impunctate. Mesoscutum 0.81 (0.70-0.83, mean 0.79) X as long as wide, 0.87 (0.85-0.94, mean 0.92) X as wide as pronotum; entirely with moderate medium punctation,

interspaces irregular and subequal to puncture diameter, posterolaterally with dense coarse punctation; posterolateral corner raised as an angulate tooth. Scutellum subsquare, entire dorsal surface densely covered with coarse punctation. Dorsellum irregular, laterally ridged. Propodeum with areola longer than neighbouring areae. Mesepisternum with pit-like, shallow reticulations, reticulations approximately same size as those on anterior portion of lateral surface of pronotum, scrobe a subrectangular depression, mesepisternal groove present, reticulations in groove twice as long as wide. Mesosternum with anterior concavity nearly impunctate, shiny, posteriorly becoming moderately punctate, punctures medium and ill-defined; no mesosternal processes.

Forewing: Pterostigma 0.99 (0.60-0.99, mean 0.82) X length of anterior margin of marginal cell. Marginal cell 3.39 (2.76-3.88, mean 3.36) X as long as wide, 1.56 (1.27-1.90, mean 1.54) X length of second submarginal. Second submarginal cell sessile anteriorly, 0.44 (0.33-0.53, mean 0.45) X length of discoidal cell. Third submarginal cell with vein 3r-m nebulous anteriorly becoming spectral posteriorly; medial vein spectral; accessory vein nebulous, 1.1 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur simple with greatest width at midlength; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.68 (0.67-0.80, mean 0.75) X length of longer spur, longer spur almost straight; basitarsus straight. Hind leg: Coxa entirely with moderate medium punctation, interspaces subequal to puncture diameter, mesal margin with longitudinal carina 0.5-0.7 X length of coxa, sometimes indistinct, ventral surface convex; trochanter simple; femur with macrosetae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae sparsely but evenly distributed, shorter than shorter spur, shorter spur 0.62 (0.57-0.80, mean 0.69) X length of longer spur, longer spur almost straight, 0.78 (0.67-0.88, mean 0.80) X length of basitarsus; basitarsus with dense microsetae, macrosetae absent, ventral surface with two, often indistinct, rows of short stout spines.

Metasoma 1.52 (1.13-1.61, mean 1.46) X as long as wide. First segment moderately narrow and fairly long, slightly constricted at apex, 2.62 (1.88-2.91, mean 2.59) X as long as wide, 2.96 (2.11-3.17, mean 2.88) X as long as high, 1.29 (0.80-1.29, mean 1.12) X as long as T2; tergum, except tergulum, with dense coarse subcircular punctation, tergulum with moderate fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum with moderate fine punctation anteriorly becoming densely and coarsely punctate posteriorly, median carina irregular, present only on anterior half. T2 0.87 (0.87-1.10, mean 1.02) X as long as wide, 0.98 (0.91-1.01, mean 1.00) X as wide as mesosoma, vestiture subdecumbent to suberect, anterior one-third with longitudinal

rectangular reticulations, sparsely and finely punctate within each reticulation, posterior two-thirds shallowly and moderately punctate, interspaces shiny and subequal to puncture diameter, felt line 0.54 (0.43-0.65, mean 0.57) X length of tergum, length anterior to felt line 1.76 (1.04-1.76, mean 1.15) X length of tergum posterior to felt line; S2 convex, setae evenly distributed and shorter than shorter mesotibial spur, entirely with moderate medium punctation, interspaces irregular and subequal to puncture diameter, anterior mesal area with strong carina < 0.5 X length of sternum, felt line 0.20 X length of upper felt line. Pygidium transverse, posterior margin strongly convex, anterior one-third irregular and moderately punctate, interspaces subequal to puncture diameter, pygidial plate anteriorly smooth although surface slightly irregular, posteriorly with dense fine punctation; hypopygium with posterior margin convex, mesal area simple. Genitalia as in fig. 35.

FEMALE: Unknown.

MATERIAL EXAMINED

TYPE MATERIAL. Holotype: ♂, "[SOUTH AFRICA:] LE CAP"; "Willowmore [33°18'S 23°30'E], / Capland / Dr. H. Brauns / 1 12 1901"; "TYPE"; "*Mut. signa- / tipennis* / André" (MNHN).

MEASURED MATERIAL. 18♂: SOUTH AFRICA: [9]Orange Free State, Bloemfontein, 29°11'S 26°09'E, 9.i.1978 (Empey) (1♂, DJBC); [3, 4, 5, 6, 7]Nieuwoudtville Caravan Park, 30°24'S 19°10'E, 20.i.1995 (P. Bayliss) light trap (5♂, DJBC); [12, 13]Graaf Reinet, Karoo Nat. Res., 31°13'S 24°32'E, 12.i.1995 (P. Bayliss & J. Kotze) light trap (2♂, DJBC); [11]Nieuwoudtville Wildflower Res., 31°22'S 19°05'E, 19.i.1995 (P. Bayliss & J. Kotze) light trap (1♂, DJBC); [8]S.W. Cape, Clanwilliam, 32°13'S 18°56'E, 12.i.1975 (Empey) (1♂, DJBC); [16, 17, 18]S.W. Cape, Clanwilliam District, Algeria Forestry Station, 32°22'S 19°03'E, 8.i.1978 (M.W. Mansell & J. Hoffmann) collected at light (3♂, NCSA); [10]Klipplaat, 33°05'S 27°04'E, 27.x.1948 (G. van Son) *det.* by Invrea as *T. signatipennis* André (1♂, TMSA); [1]Willowmore, 33°18'S 23°30'E, 15.x.1901 (Dr. Brauns) *det.* by André as *T. signatipennis* André (1♂, TMSA), [14]5.iii.1910 (Dr. Brauns) (1♂, TMSA), [15]5.i.1912 (Dr. Brauns) *det.* as *T. signatipennis* André (1♂, TMSA); [2]Ceres, 33°22'S 19°17'E, xii.1949 (W. Hanekom) (1♂, DJBC); Swellendam, Bontebok Park, 34°01'S 20°26'E, xii.1963 (1♂, NCSA).

ADDITIONAL MATERIAL. 19♂: SOUTH AFRICA: Chicago, Lindley District, 29°25'S 29°36'E, 17-28.i.1968 (D.J. Brothers) (1♂, DJBC); Nieuwoudtville Caravan Park, 30°24'S 19°10'E, 20.i.1995 (P. Bayliss) light trap (4♂, DJBC); Graaf Reinet, Karoo Nat. Res., 31°13'S 24°32'E, 12.i.1995 (P. Bayliss & J. Kotze) light trap (2♂, DJBC); Nieuwoudtville Wildflower Res., 31°22'S 19°05'E, 19.i.1995

(P. Bayliss & J. Kotze) light trap (3♂, DJBC); S.W. Cape, Clanwilliam, 32°13'S 18°56'E, 12.i.1975 (Empey) (2♂, DJBC); S.W. Cape, Clanwilliam District, Algeria Forestry Station, 32°22'S 19°03'E, 8.i.1978 (M.W. Mansell & J. Hoffmann) collected at light (2♂, NCSA); Klipplaat, 33°05'S 27°04'E, 17.x.1948 (G. van Son) *det.* as *T. signatipennis* André (1♂, TMSA), 27.x.1948 (G. van Son) *det.* as *T. signatipennis* André (1♂, TMSA); Calitzdorp, nr, campsite at bottom of Huisriver Pass, 33°32'S 21°41'E, 9.i.1975 (M. Mansell) (1♂, DJBC); Calitzdorp, 5 mi. S.W. Calitzdorp, Huisriver Pass, 33°32'S 21°41'E, 13-15.xi.1972 (van Reenen & Mathabathe) (1♂, TMSA); Montagu, 33°36'S 22°12'E (F.E. Purcell) *Tricholabiodes signatipennis* André (1♂, SAMC); Swellendam, Bontebok Park, 34°01'S 20°26'E, xii.1963 (1♂, NCSA).

DISTRIBUTION

This species occurs in South Africa, with specimens recorded from the western and southernmost parts of the country (fig. 99).

DISCUSSION

André (1901) described *T. signatipennis* from a single specimen, collected by H. Brauns in 1901. He again refers to this species in a catalogue of all described species of *Tricholabiodes* (André 1902). Bischoff (1920) included *T. signatipennis* in a key and provides a short commentary on the species, correcting André's (1901) description. Suárez (1990) included *T. signatipennis* in a catalogue to almost all of the described species of *Tricholabiodes*.

Tricholabiodes signatipennis is most similar to *T. stigmaticus*. These two species can be separated by the posterior shape of the head behind the compound eyes and coloration of the legs. In *T. signatipennis*, the sides of the head behind the compound eyes are subparallel and the legs are entirely pale to dark reddish-black. In *T. stigmaticus*, the head is with sides behind the compound eyes slightly convergent posteriorly and the legs are entirely pale yellowish-brown.

***Tricholabiodes andrei* Bischoff, 1920. ♂**

[*Tricholabioides* [*sic*]] *andrei* Bischoff, 1920:101, 103, 108. ♂

[*Tricholabioides* (*sic*)] *andrei* Bischoff; Suárez, 1990:186. ♂

DIAGNOSIS

MALE: Head black; metasoma with T1 almost entirely pale reddish-black except anterior dorsal third medium to dark yellowish-brown, T2-T6 entirely black, sterna paler than corresponding terga. Head with sides behind compound eyes subparallel, distinct from weakly convex posterior margin. Frons with scrobal carina with anterior half straight, extending posteriorly and diagonally across the frons, away from median longitudinal groove. Free border of clypeus with mesal area strongly protruding in an arch, arch mesally notched forming a triangulate protuberance on each side of midline. Middle and inner mandibular tooth adjacent. Dorsellum laterally ridged. Mesepisternum with scrobe and mesepisternal groove present. Mesosternum with no mesosternal processes. Forewing with 2nd submarginal cell sessile anteriorly. Mesal margin of metacoxa with slight, ill-defined carina, 0.5 X length of coxa. Metasoma with anterior two-thirds of T2 costulate, sparsely and finely punctate between costae; anterior mesal area of S2 with strong carina < 0.5 X length of sternum, S2 with felt line. Pygidium with pygidial plate anteriorly smooth although surface slightly irregular, posteriorly with dense fine punctation; posterior margin of hypopygium convex. Genitalia as in fig. 36.

REDESCRIPTION

MALE: Length 10.41 (9.49-12.96, mean 11.56) mm. Head black; clypeus and antenna medium yellowish-brown to pale reddish-black; mandible almost entirely pale to dark reddish-black, apex black, ventral tooth pale reddish-black; mesosoma medium yellowish-brown; legs, including coxae and tibial spurs, medium yellowish-brown to dark reddish-black; forewing darkly infuscated posterior to pterostigma; pterostigma pale to dark reddish-black; wing veins medium yellowish-brown; metasoma with T1 almost entirely pale reddish-black, except anterior dorsal third medium to dark yellowish-brown, T2-T6 entirely black, sterna paler than corresponding terga; entire body covered in long, pallid setae.

Head 1.37 (1.34-1.49, mean 1.41) X as wide as long, 0.82 (0.82-0.88, mean 0.84) X as wide as mesosoma, 1.37 (1.37-1.47, mean 1.43) X as wide as vertex, 1.87 (1.60-1.87, mean 1.78) X as long as compound eye, sides behind compound eyes subparallel, distinct from weakly convex posterior margin. Frons anteriorly with dense coarse punctation, punctures decreasing in density and size posteriorly, interspaces irregular and narrower than puncture diameter; foveola deep; surface between median ocellus and foveola with longitudinal median groove, sides tapering anteriorly, between toruli longitudinal median groove v-shape in section and deep; scrobal carina with anterior half straight, extending posteriorly and diagonally across the frons away from median longitudinal groove, posteriorly sometimes slightly arcuate, often reaching scrobal tubercle; antennal tubercle simple, with sparse fine punctation. Vertex 0.56 (0.56-0.69, mean 0.65) X as long as wide, 1.22 (1.10-1.32, mean 1.22) X as wide as frons; posterior to lateral ocellus with dense medium punctation, interspaces irregular and subequal to puncture

diameter. Compound eye with ommatidia distinct. Ocelli large, convex and broadly oval, median ocellus 0.84 (0.84-0.98, mean 0.93) X as long as wide, interocellar distance 1.28 (0.90-1.28, mean 1.06) X ocellocular distance. Gena with dense coarse punctation, sometimes with punctures decreasing in density and size posteriorly, interspaces shiny. Clypeus 0.37 (0.37-0.44, mean 0.40) X as high as wide, free border with mesal area strongly protruding in an arch, arch mesally notched forming a triangulate protuberance on each side of midline; central portion raised and slightly convex, mesal area between the tubercles sometimes slightly longitudinally depressed, with sparse fine punctation, interspaces 3 X puncture diameter; vestiture length longer than height of clypeus, inconspicuous. Mandible higher than thick, dorsal rim with carina along entire length, ending at base of inner tooth; apex tridentate with apical tooth 2 X length of middle tooth, middle and inner teeth adjacent, inner tooth rounded; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 0.93 (0.90-1.08, mean 1.01) X height at base. Antenna with scape 1.38 (1.38-1.68, mean 1.54) X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere simple; second flagellomere 1.25 (1.25-1.36, mean 1.30) X length of first, 1.03 (0.97-1.04, mean 1.02) X length of third.

Mesosoma, excluding anterior collar, 1.63 (1.63-1.74, mean 1.70) X as long as wide. Pronotum 0.88 (0.87-0.90, mean 0.88) X as wide as mesosoma, anterodorsal surface irregular mesally becoming pit-like shallow reticulations laterally, strongly convex, humeral angle subsquare; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet smaller than the size of a reticulation; posterior portion of lateral surface with sparse fine punctation, interspaces irregular and wider than puncture diameter, posterior margin impunctate. Mesoscutum 0.78 (0.73-0.84, mean 0.77) X as long as wide, 0.91 (0.88-0.94, mean 0.92) X as wide as pronotum; entirely with moderate medium punctation, interspaces shiny, irregular and subequal to puncture diameter, posterolaterally with dense coarse punctation; posterolateral corner raised as an angulate tooth. Scutellum subtrapezoidal, posteriorly convergent, entire dorsal surface densely covered with coarse punctation. Dorsellum irregular, laterally ridged. Propodeum with areola longer than neighbouring areae. Mesepisternum with pit-like, shallow reticulations, reticulations approximately same size as those on anterior portion of lateral surface of pronotum, scrobe a distinct subrectangular depression, mesepisternal groove present, reticulations in groove twice as long as wide. Mesosternum with anterior concavity nearly impunctate, shiny, posteriorly becoming moderately to densely punctate, punctures medium and ill-defined; no mesosternal processes.

Forewing: Pterostigma 0.98 (0.64-0.98, mean 0.74) X length of anterior margin of marginal cell. Marginal cell 3.27 (2.82-3.77, mean 3.24) X as long as wide, 1.51 (1.26-1.53, mean 1.43) X length of

second submarginal. Second submarginal cell sessile anteriorly, 0.38 (0.37-0.52, mean 0.44) X length of discoidal cell. Third submarginal cell with vein 3r-m anteriorly nebulous becoming spectral posteriorly; medial vein spectral; accessory vein nebulous, 1.2 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur simple with greatest width at midlength; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.74 (0.65-0.74, mean 0.70) X length of longer spur, longer spur almost straight; basitarsus straight. Hind leg: Coxa entirely with dense medium punctation, interspaces narrower than puncture diameter, mesal margin with slight, ill-defined carina, 0.5 X length of coxa, ventral surface convex; trochanter simple; femur with macrosetae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae sparsely but evenly distributed, shorter than shorter spur, shorter spur 0.65 (0.65-0.68, mean 0.66) X length of longer spur, longer spur almost straight, 0.81 (0.66-0.81, mean 0.74) X length of basitarsus; basitarsus with dense microsetae, macrosetae absent, ventral surface with a row of short stout spines but sometimes indistinct.

Metasoma 1.15 (1.06-1.28, mean 1.19) X as long as wide. First segment moderately narrow and fairly long, slightly constricted at apex, 2.76 (2.20-2.76, mean 2.34) X as long as wide, 2.91 (2.22-2.91, mean 2.41) X as long as high, 1.18 (0.96-1.18, mean 1.09) X as long as T2; tergum, except tergulum, with dense coarse subcircular punctation, tergulum with moderate fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum with moderate sparse punctation anteriorly becoming densely and coarsely punctate posteriorly, median carina interrupted. T2 0.90 (0.88-1.02, mean 0.96) X as long as wide, 0.94 (0.96-1.03, mean 0.99) X as wide as mesosoma, vestiture sparse, anterior two-thirds strongly costulate, sparsely and finely punctate between costae, posterior two-thirds with dense medium punctation, interspaces shiny and narrower than puncture diameter, felt line 0.55 (0.48-0.67, mean 0.59) X length of tergum, length anterior to felt line 0.96 (1.04-1.15, mean 1.06) X length of tergum posterior to felt line; S2 convex, setae evenly distributed and shorter than shorter mesotibial spur, entirely with moderate medium punctation, interspaces anteriorly irregular, posteriorly smooth and shiny, mesal area with strong carina < 0.5 X length of sternum, felt line 0.15 X length of upper felt line. Pygidium transverse, posterior margin strongly convex, anterior one-third irregular and moderately punctate, interspaces subequal to puncture diameter, pygidial plate anteriorly smooth although surface slightly irregular, posteriorly with dense fine punctation; hypopygium with posterior margin convex, mesal area simple. Genitalia as in fig. 36.

FEMALE: Unknown.

MATERIAL EXAMINED

TYPE MATERIAL. Holotype: ♂, "[SOUTH AFRICA:] Transvaal / Bachmann S."; "31418"; "TYPE";"*Tricholabiodes* / *signatipennis* / André / var. ♂"; "André det."; "*andrei* Bisch.*" (ZMHB). Measured paratype: 1♂: SOUTH AFRICA: W. Capland, Hopefield, 33°04'S 18°21'E (S. Bachmann) Paratype, *det.* as *andrei* Bisch. (1♂, ZMHB).

MEASURED MATERIAL. 7♂: SOUTH AFRICA: [1, 2]Leipoldtville, 32°13'S 18°29'E, xi.1956 (2♂, SAMC); [7]Clanwilliam, 32°13'S 18°56'E, 11-12.x.1949 (Dr. C. Koch) *det.* by Invrea as *T. andrei* Bisch. (1♂, TMSA); [4, 5, 6]C.P., Wellington, Rooshoek, 33°34'S 19°04'E, xii.1973 (P.M.F. Verhoeff) *det.* as *Tricholabiodes* sp. (1♂) (3♂, MNCN); [3]Cape Town, 34°02'S 18°27'E, 7.ii.1956, *det.* by Arnold as *Tricholabiodes andrei* Bisch. (1♂, SAMC).

ADDITIONAL MATERIAL. 5♂: SOUTH AFRICA: Leipoldtville, 32°13'S 18°29'E, xi.1956 (1♂, SAMC); C.P., Wellington, Rooshoek, 33°34'S 19°04'E, 17-30.xi.1973 (1♂), xii.1973 (2♂) (P.M.F. Verhoeff) (3♂, MNCN); Montagu, 33°36'S 22°12'E, x-xi.1919 (1♂, SAMC); Cape Town, 34°02'S 18°27'E, i.1924 (Péringuey) (1♂, SAMC).

DISTRIBUTION

This species occurs in South Africa, with specimens recorded from the western and southernmost parts of the country (fig. 100).

DISCUSSION

Bischoff (1920) described this species from two specimens, designating the better specimen as the holotype. The description is vague, serving more as a diagnosis of the diagnostic features. Characters referred to include coloration, body shape, forewing venation and sculpturing. Suárez (1990) included *T. andrei* in a catalogue of virtually all described species of the genus.

This species is most similar to *T. paulocellatus* but can easily be recognized by the size of the ocelli. In *T. paulocellatus*, the ocelli are small (ocellocular distance at least 1.5 X width of lateral ocellus), unlike the ocelli in *T. andrei* which are large (ocellocular distance smaller than width of lateral ocellus).

***Tricholabiodes stigmaticus* Bischoff, 1920. ♂**

[*Tricholabioides* [*sic*] *stigmatica* [*sic*] Bischoff, 1920:103, 107. ♂

[*Tricholabioides* [*sic*] *semistriataeformis* Bischoff, 1920:103, 106. ♂ **syn. nov.**

[*Tricholabioides* [*sic*] *stigmatica* [*sic*] Bischoff; Suárez, 1990:187. ♂

[*Tricholabioides* [*sic*] *semistriataeformis* Bischoff; Suárez, 1990:187. ♂

The values in square brackets refers to the holotype of *T. semistriataeformis*.

DIAGNOSIS

MALE: Metasoma with T1 entirely medium yellowish-brown becoming darker posteriorly, T2-T6 entirely medium reddish-black to entirely black, sterna paler than corresponding terga. Head with sides behind compound eyes slightly convergent posteriorly and gradually merging with weakly convex posterior margin. Frons with scrobal carina present. Free border of clypeus strongly protruding in an arch, arch mesally notched forming a triangulate protuberance on each side of midline. Middle and inner mandibular tooth adjacent. Dorsellum laterally ridged. Mesepisternum with scrobe and mesepisternal groove present. Mesosternum with anterior concavity transversely ridged; no mesosternal processes. Forewing with 2nd submarginal cell sessile anteriorly. Mesal margin of metacoxa with slight, ill-defined longitudinal carina 0.7 X length of coxa. Metasoma with anterior one-third of T2 either with longitudinal rectangular reticulations, sparsely and finely punctate within each reticulation, or slightly costulate; anterior mesal area of S2 with slight carina < 0.5 X length of sternum, S2 with felt line sometimes present. Pygidium with pygidial plate anteriorly smooth although surface slightly irregular, posteriorly densely and finely punctate; posterior margin of hypopygium convex. Genitalia as in fig. 37.

REDESCRIPTION

MALE: Length 11.07 ([11.85] 10.95-12.26, mean 11.53) mm. Head, including clypeus and antenna, pale to medium yellowish-brown, sometimes between ocelli pale reddish-black; mandible almost entirely pale yellowish-brown, apex black, ventral tooth pale reddish-black; mesosoma medium yellowish-brown; legs, including coxae and tibial spurs, pale yellowish-brown; forewing lightly infuscated posterior to marginal cell; pterostigma and wing veins pale yellowish-brown; metasoma with T1 entirely medium yellowish-brown becoming darker posteriorly, T2-T6 medium reddish-black to entirely black, sterna paler than corresponding terga.

Head 1.40 ([1.44] 1.36-1.44, mean 1.42) X as wide as long, 0.87 ([0.92] 0.82-1.08, mean 0.89) X as wide as mesosoma, 1.48 ([1.56] 1.42-1.52, mean 1.47) X as wide as vertex, 1.50 ([1.47]1.47-1.90, mean 1.71) X as long as compound eye, sides behind compound eyes slightly convergent posteriorly and

gradually merging with weakly convex posterior margin. Frons with sparse fine punctation, interspaces shiny and wider than puncture diameter; foveola deep; surface between median ocellus and foveola with slight longitudinal median groove, between toruli longitudinal median groove v-shape in section and deep; scrobal carina with anterior half straight, extending posteriorly and diagonally across the frons away from median longitudinal groove, posteriorly sometimes slightly arcuate, scrobal tubercle small; antennal tubercle simple, with sparse fine punctation. Vertex 0.65 ([0.74]0.59-0.77, mean 0.70) X as long as wide, 1.24 ([1.30]1.09-1.42, mean 1.25) X as wide as frons; posterior to lateral ocellus with sparse fine punctation, interspaces shiny and wider than puncture diameter. Compound eye with ommatidia distinct. Ocelli large, convex and broadly oval, median ocellus 0.81 ([0.80] 0.80-1.04, mean 0.95) X as long as wide, interocellar distance 1.70 ([1.71] 0.86-1.71, mean 1.24) X ocellocular distance. Gena with sparse medium punctation, interspaces irregular. Clypeus 0.41 ([0.41] 0.35-0.46, mean 0.40) X as high as wide, free border with mesal area strongly protruding in an arch, arch mesally notched forming a triangulate protuberance on each side of midline; central portion raised and slightly convex, median area between the tubercles sometimes slightly longitudinally depressed, with moderate medium punctation, interspaces subequal to puncture diameter; vestiture length subequal to or longer than height of clypeus. Mandible higher than thick, dorsal rim with carina along entire length, ending at base of inner tooth; apex tridentate with apical tooth 2 X length of middle tooth, middle and inner teeth adjacent, inner tooth subrounded; mesal margin smooth; ventral margin strongly excised, subtending tooth well developed with apex obliquely rounded, mandibular height across ventral tooth 0.91 ([0.96] 0.91-1.06, mean 0.99) X height at base. Antenna with scape 1.63 ([1.61] 1.46-1.68, mean 1.59) X length of first flagellomere, anterior surface with one longitudinal carina; first flagellomere simple; second flagellomere 1.30 ([1.22] 1.22-1.43, mean 1.36) X length of first, 0.98 ([1.01] 0.97-1.07, mean 1.02) X length of third.

Mesosoma, excluding anterior collar, 1.68 ([1.68] 1.54-2.09, mean 1.72) X as long as wide. Pronotum 0.97 ([0.97] 0.84-1.10, mean 0.90) X as wide as mesosoma, anterodorsal surface irregular mesally becoming pit-like shallow reticulations laterally, strongly convex, humeral angle subrounded; anterior portion of lateral surface with pit-like, shallow reticulations, lateral epaulet distinct and almost as large as a reticulation; posterior portion of lateral surface rough striated with sparse fine punctation, interspaces irregular and wider than puncture diameter, posterior margin impunctate. Mesoscutum 0.81 ([0.74] 0.73-0.85, mean 0.77) X as long as wide, 0.87 ([0.83] 0.83-0.94, mean 0.88) X as wide as pronotum; between notauli with moderate medium punctation, interspaces shiny, irregular and subequal to puncture diameter; laterally with sparse medium punctation, posterolaterally with dense coarse punctation; posterolateral corner raised as an angulate tooth. Scutellum subsquare, entire dorsal surface

densely covered with pit-like reticulations. Dorsellum irregular, laterally ridged. Propodeum with areola same length as neighbouring areae. Mesepisternum, anterior to mesepisternal groove with sparse to moderate, medium punctation, increasing in density and size posteriorly, posterior to mesepisternal groove with pit-like, shallow reticulations, reticulations approximately same size as those on anterior portion of lateral surface of pronotum, scrobe a distinct subcircular depression, mesepisternal groove present, reticulations in groove twice as long as wide. Mesosternum with anterior concavity transversely ridged, posteriorly sparsely punctate, punctures medium and ill-defined; no mesosternal processes.

Forewing: Pterostigma 0.88 ([0.95] 0.63-1.03, mean 0.81) X length of anterior margin of marginal cell. Marginal cell 3.20 ([3.16] 2.96-3.88, mean 3.35) X as long as wide, 1.41 ([1.45] 1.24-1.57, mean 1.53) X length of second submarginal. Second submarginal cell sessile anteriorly, 0.50 ([0.48] 0.41-0.52, mean 0.45) X length of discoidal cell. Third submarginal cell with vein 3r-m tubular anterior to junction with accessory vein, nebulous becoming spectral posterior to junction with accessory vein; medial vein spectral; accessory vein nebulous, 1.2 X longer than marginal cell.

Legs. Mid leg: Coxa unarmed; femur simple with greatest width at midlength; tibia simple with macrosetae shorter than shorter spur, shorter spur 0.72 ([0.73] 0.64-0.78, mean 0.73) X length of longer spur, longer spur almost straight; basitarsus straight. Hind leg: Coxa entirely with moderate medium punctation, interspaces subequal to puncture diameter, mesal margin with slight, ill-defined longitudinal carina 0.7 X length of coxa, ventral surface convex; trochanter simple; femur with macrosetae evenly distributed, all subequal in length, shorter than shorter tibial spur; tibial macrosetae sparsely but evenly distributed, shorter than shorter spur, shorter spur 0.64 ([0.63] 0.62-0.71, mean 0.67) X length of longer spur, longer spur almost straight, 0.72 ([0.70] 0.69-0.89, mean 0.78) X length of basitarsus; basitarsus with dense microsetae, macrosetae absent, ventral surface with a row of short stout spines.

Metasoma 1.45 ([1.49] 1.27-1.56, mean 1.44) X as long as wide. First segment moderately narrow and fairly short, slightly constricted at apex, 2.51 ([2.51] 2.08-2.51, mean 2.21) X as long as wide, 2.81 ([2.94] 2.31-2.94, mean 2.42) X as long as high, 1.00 ([1.00] 0.85-1.00, mean 0.92) X as long as T2; tergum, except tergulum, with dense coarse subcircular punctation, tergulum with sparse fine punctation anteriorly, interspaces shiny and subequal to puncture diameter, smooth and shiny posteriorly; sternum with moderate fine punctation anteriorly becoming densely and coarsely punctate posteriorly, median area irregular. T2 0.98 ([0.97] 0.96-1.09, mean 1.01) X as long as wide, 0.92 ([0.94] 0.87-1.08, mean 0.96) X as wide as mesosoma, vestiture subdecumbent to suberect, anterior one-third either with longitudinal rectangular reticulations, sparsely and finely punctate within each reticulation, or slightly

costulate, posterior two-thirds shallowly and moderately punctate, interspaces shiny and subequal to puncture diameter, felt line 0.60 ([0.57] 0.46-0.64, mean 0.56) X length of tergum, length anterior to felt line 1.00 ([1.08] 1.00-1.35, mean 1.14) X length of tergum posterior to felt line; S2 convex, setae evenly distributed and shorter than shorter mesotibial spur, entirely with moderate medium punctation, interspaces anteriorly irregular, posteriorly smooth and shiny, mesal area with slight carina < 0.5 X length of sternum, felt line, if present, 0.15 X length of upper felt line. Pygidium transverse, posterior margin strongly convex, anterior one-third irregular and moderately punctate, interspaces subequal to puncture diameter, pygidial plate anteriorly smooth although surface slightly irregular, posteriorly with dense fine punctation; hypopygium with posterior margin convex, mesal area simple. Genitalia as in fig. 37.

FEMALE: Unknown.

MATERIAL EXAMINED

TYPE MATERIAL. Holotype (*T. stigmaticus*): ♂, "Süd-West- / Africa [= Namibia] / Meyer" [handwritten]; "31419"; "*Tricholabiodes / semele* Pér / ♂"; "André det"; "*stigmatica* [*sic*] / Bisch.*"; "Type" (ZMHB).

Holotype (*T. semistriataeformis*): ♂, "[SOUTH AFRICA:] Capland / Drege S."; "6791"; "gracilis / Cáp. Dr."; "Type"; "*Tricholabiodes / semele* Pér / ♂"; "*semistriatae- / formis* Bisch. / *" (ZMHB).

MEASURED MATERIAL. 16♂: SOUTH AFRICA: [6, 7]Brakfontein, Richtersveld, 28°15'S 17°10'E, 18.xi.1933 (G. van Son) *det.* as *T. semistriataeformis* Bisch. (3♂, TMSA); [1]Nieuwoudtville Caravan Park, 30°24'S 19°10'E, 20.i.1995 (P. Bayliss) light trap (1♂, DJBC); [2]Nieuwoudtville Wildflower Res., 31°22'S 19°05'E, 19.i.1995 (P. Bayliss & J. Kotze) light trap (1♂, DJBC); Bulhoek, Klaver, Clanwilliam, 31°47'S 18°37'E, x.1950 (Mus. Expd.) (2♂, SAMC); [8]Karoo Nat. Park, 32°20'S 22°30'E, 13.xii.1988 (M.W. Mansell) (1♂, NCSA); Beaufort West, 32°21'S 22°35'E, ii.1958 (1♂, SAMC); [3]S.W. Cape, Cederberg, "Kromrivier" Farm, 875 M, 32°33'S 19°18'E, 4-5.i.1975 (M.W. Mansell) collected at light (1♂, NCSA); Merweville, Dikbome, 32°40'S 21°31'E, x.1952 (Mus. Expd.) (1♂, SAMC); [4, 5]Prince Albert, 20 km NE , Tierberg Farm, 33°15'S 22°03'E, 14.i.1995 (P. Bayliss & J. Kotze) light trap (2♂, DJBC), 15.i.1995 (P.S. Bayliss, J. Kotze & H. Adie) light trap (1♂, DJBC); Capland, Willowmore, 33°18'S 23°30'E, 25.xii.1901 (Dr. Brauns) (1♂, MNHN), 29.xi.1915 (Dr. Brauns) *det.* as *T. semistriataeformis* Bisch. (1♂, TMSA).

ADDITIONAL MATERIAL. 44♂: SOUTH AFRICA: Brakfontein, Richtersveld, 28°15'S 17°10'E,

18.xi.1933 (G. van Son) *det.* by Invrea (1♂) as *T. semistriataeformis* Bisch. (5♂, TMSA); Windsorton, 28°20'S 24°43'E, i.1921 (Dr. Brauns) *det.* as *T. signatipennis* André (1♂, TMSA); Bulshoek, Clanwilliam, 30°10'S 18°21'E, xii.1956 (2♂, SAMC); Nieuwoudtville Caravan Park, 30°24'S 19°10'E, 20.i.1995 (P. Bayliss) light trap (1♂, DJBC); H.F. Verwoed Dam, 30°38'S 25°30'E, 8-11.xii.1969 (J.H. Potgieter) (1♂, TMSA); Noupoort, 31°10'S 24°56'E, x.1948 (C. Koch) (1♂, TMSA); Nieuwoudtville Wildflower Res., 31°22'S 19°05'E, 19.i.1995 (P. Bayliss & J. Kotze) light trap (2♂, DJBC); Bulhoek, Klaver, Clanwilliam, 31°47'S 18°37'E, x.1950 (Mus. Expd.) (1♂, SAMC); Cradock, 32°11'S 25°37'E (2♂, MTMB), *det.* as *T. semele* (1♂, MTMB); Karoo Nat. Park, 32°20'S 22°30'E, 13.xii.1988 (M.W. Mansell) (1♂, NCSA); Prince Albert, 20 km NE., Tierberg Farm, 33°15'S 22°03'E, 29.x.1994 (H. Adie) attracted to light (2♂, DJBC), 15.i.1995 (P.S. Bayliss, J. Kotze & H. Adie) light trap (15♂, DJBC), 26.i.1995 (P.S. Bayliss) light trap (1♂, DJBC), 16.xi.1995 (H. Adie) attracted to night light (6♂, DJBC); 18 m. E. of Touws R. to Hondewater, 33°59'S 22°36'E, xii.1962 (2♂, SAMC).

DISTRIBUTION

This species occurs in southern Africa, with specimens seen from Namibia and the northwestern and southernmost regions of South Africa (fig. 100).

DISCUSSION

Tricholabiodes stigmaticus was described by Bischoff (1920) from a single male, collected by Meyer. The description, which refers particularly to coloration, wing venation, sculpturing and structure of the carina on S2, is vague, serving more as a diagnosis. There have been no subsequent redescriptions of *T. stigmaticus*, nor has this species been included in any subsequent key, besides that of Bischoff (1920). Suárez (1990) included *T. stigmaticus* in a catalogue of virtually all described species of the genus.

Bischoff (1920) described *T. semistriataeformis* from a single male. The description, which refers particularly to coloration and wing venation, is vague, serving more as a diagnosis. There have been no subsequent redescriptions of *T. semistriataeformis*, nor has this species been included in any subsequent key, besides that of Bischoff (1920).

Tricholabiodes semistriataeformis and *T. stigmaticus* are almost identical. The only difference between these two species is the sculpturing pattern on T2. In *T. stigmaticus*, the anterior one-third of T2 is slightly costulated, while in *T. semistriataeformis* the anterior one-third of T2 is either slightly costulated or is comprised of longitudinal rectangular reticulations. I only saw one specimen, from Namibia, identified as *T. stigmaticus*, while *T. semistriataeformis* is a fairly commonly recorded species from

South Africa. No specimens identified as *T. semistriataeformis* have been recorded from Namibia. I do not believe this geographical disjunction, nor the slight difference in T2 sculpturing, is sufficient evidence for recognizing *T. stigmaticus* and *T. semistriataeformis* as distinct species; furthermore, the genitalia of the two holotypes are identical. Therefore, *T. semistriataeformis* is synonymised with *T. stigmaticus*.

Tricholabiodes stigmaticus is most similar to *T. signatipennis*. These two species can be separated by the posterior shape of the head behind the compound eyes and the coloration of the legs. In *T. stigmaticus*, the sides of head behind the compound eyes are slightly convergent posteriorly and the legs are entirely pale yellowish-brown. In *T. signatipennis*, the sides of the head behind the compound eyes are subparallel and the legs are entirely pale to dark reddish-black.

9.4. SPECIES OF *TRICHOLABIODES* NOT STUDIED

Provided below is a list of species and subspecies, including females, not studied. The synonymy lists are only preliminary. Only upon study of the material can it be confirmed whether the references listed below each species or subspecies are correct.

***Tricholabiodes aegyptiacus* (Radoszkowski, 1876).** ♀

Mutilla Aegyptiaca [*sic*] Radoszkowski, 1876:138. ♀

M. [*utilla* (*Tricholabiodes*)] *aegyptiaca* [*sic*] Rad.[oszkowski]; André, 1896a:267. ♀

[*Mutilla*] *aegyptiaca* [*sic*] Rad.[oszkowski]; Dalla Torre, 1897:7. ♀

M. [*utilla* (*Tricholabiodes*)] *aegyptiaca* [*sic*] Rad.[oszkowski]; André, 1901:286. ♀

T. [*richolabiodes*] *aegyptiaca* [*sic*] (Radoszkowski); André, 1902:21. ♀

[*Tricholabiodes*] *aegyptiaca* [*sic*] (Rad.[oszkowski]); André, 1909a:123. ♀

[*Tricholabiodes*] *aegyptiaca* [*sic*] (Rad.[oszkowski]); André, 1909b:73. ♀

Tricholabioides [*sic*] *aegyptiaca* [*sic*] (Rad.[oszkowski]); Mantero, 1915:318. ♀

[*Tricholabioides* [*sic*]] *semistriata* [*sic*] Klug; Bischoff, 1920:102, 104 (misidentification). ♀

Tr. [*icholabioides* [*sic*]] *aegyptiaca* [*sic*] (Rad.[oszkowski]); Skorikov, 1935:306, tab. 5, fig. 3. ♀

[*Tricholabioides* [*sic*]] *aegyptiaca* [*sic*] [(Radoszkowski)]; Suárez, 1963:922, 923. ♀

Tricholabioides [*sic*] *aegyptiaca* [*sic*] (Rad.[oszkowski]); Invrea, 1965:62. ♀

[*Tricholabioides* [*sic*]] *aegyptiaca* [*sic*] (Rad.[oszkowski]); Suárez, 1990:186. ♀

Distribution. Egypt.

***Tricholabiodes craspedopygius* Suárez, 1967.** ♀

Tricholabioides [*sic*] *craspedopygius* Suárez, 1967:570. ♀

Tricholabioides [*sic*] *craspedopygius* Suárez; Suárez, 1990:174, 186, fig. 30 (a). ♀

Distribution. Ethiopia.

***Tricholabiodes denticrus* Bischoff, 1920.** ♂

[*Tricholabioides* [*sic*] *semistriata* [*sic*] (Klug)] subsp. *denticrus* Bischoff, 1920:105. ♂

Tricholabioides [*sic*] *denticrus* Bischoff; Suarez, 1990:135, 182, 186, figs 2(h), 3(g), 4(b), 5(c), 6(f), 10, 14. ♂

Distribution. Djibouti.

***Tricholabiodes israeliticus* Suárez, 1967.** ♂

Tricholabioides [*sic*] *israeliticus* Suárez, 1967:564. ♂

Tricholabioides [*sic*] *israeliticus* Suárez; Suárez, 1990:141, 184, 186, figs 2(I), 3(e), 5(b), 6(c), 11, 15. ♂

Distribution. Israel.

***Tricholabiodes mendax* (André, 1898).** ♀

Mutilla aegyptiaca [*sic*] Rad.[oszkowski]; André, 1898:70. ♀

Mutilla mendax André, 1899:23. ♀

Distribution. Djibouti.

***Tricholabiodes nuristanus* Lelej, 1980.** ♂

Tricholabiodes nuristanus Lelej; Lelej & Kabakov, 1980:186. ♂

Tricholabiodes nuristanus Lelej; Lelej & Kabakov, 1981:146. ♂

Tricholabiodes nuristanus Lelej; Lelej, 1985:149. ♂

[*Tricholabioides* [*sic*]] *nuristanus* Lelej; Suárez, 1990:186. ♂

Distribution. Afghanistan.

***Tricholabiodes niloticus persicus* Suárez, 1967.** ♂

Tricholabioides [*sic*] *niloticus persicus* Suárez, 1967:570. ♂

T. [*richolabiodes*] *persicus* Suár.[ez]; Lelej, 1985:151. ♂

[*Tricholabioides* [*sic*]] *niloticus persicus* Suárez; Suárez, 1990:185, 186, fig. 34. ♂

Distribution. Iran.

***Tricholabiodes semistriatus* (Klug, 1829).** ♀

[*Mutilla*] *semistriata* [*sic*] Klug, 1829:tab. 4, fig. 9. ♀

M. [*utilla*] *semistriata* [*sic*] Klug; Sichel & Radoszkowski, 1869:154, 175. ♀

[*Mutilla*] *semistriata* [*sic*] Klug; Dalla Torre, 1897:85. ♀

Mutilla (*Tricholabiodes*) *semistriata* [*sic*] Klug; André, 1901:284, 286. ♀

T. [*richolabiodes*] *semistriata* [*sic*] (Klug); André, 1902:21. ♀

[*Mutilla* (*Tricholabiodes*)] *semistriata* [*sic*] Klug; André, 1903:170, Pl. 7 (1). ♀

T. [*richolabioides* [*sic*]] *semistriata* [*sic*] (Klug); Magretti, 1905:39. ♀

Trich [*olabiodes*] *semistriata* [*sic*] (Klug); André, 1910:32. ♀

[*Tricholabioides* [*sic*]] *semistriata* [*sic*] (Klug); Bischoff, 1920:99, 102, 103, 109 (in part ?). ♀

Tricholabioides [*sic*] *semistriata* [*sic*] (Klug); Suárez, 1963:922. ♀

Tricholabioides [*sic*] *semistriata* [*sic*] (Kl.[ug]); Invrea, 1965:61. ♀

Tricholabioides [*sic*] *semistriata* [*sic*] (Klug); Suárez, 1990:176, 186, 187, fig. 30(b). ♀

Distribution. Egypt, Djibouti, Somalia and Cameroon.

***Tricholabiodes somalicus* Suárez, 1967.** ♂

Tricholabioides [*sic*] *semistriata* [*sic*] (Kl.[ug]); Invrea, 1962:326 (misidentification). ♂

Tricholabioides [*sic*] *somalicus* Suárez, 1967:567. ♂

Tricholabioides [*sic*] *somalicus* Suárez; Suárez, 1990:165, 184, 187, fig. 1(e), 2(b), 4(l), 5(e), 6(a), 25, 28. ♂

Distribution. Somalia.

***Tricholabiodes stenothorax* Suárez, 1967.** ♀

Tricholabioides [*sic*] *stenothorax* Suárez, 1967:572. ♀

[*Tricholabioides* [*sic*] *stenothorax* Suárez; Suárez, 1990:186, 187. ♀

Distribution. Central Sahara.

***Tricholabiodes tenuistriatus* Suárez, 1967.** ♀

Tricholabioides [*sic*] *tenuistriatus* Suárez, 1967:571. ♀

[*Tricholabioides* [*sic*]] *tenuistriatus* Suárez; Suárez, 1977:218, 219. ♀

Tricholabioides [*sic*] *tenuistriatus* Suárez; Suárez, 1990:179, 185, 187. ♀

Distribution. Cameroon.

9.5. SPECIES OF UNCERTAIN STATUS

***Mutilla polyxene* Péringuey, 1898.** ♀

Mutilla polyxene Péringuey, 1898:51. ♀

polyxene Péringuey; Bischoff, 1920:749. ♀

Mutilla polyxene Péringuey; Brothers (MS). ♀

This species was described from "Female ... 3⅓ mm ... Cape Colony (Hopetown)", presumably from one specimen since no size range was given. Brothers (MS), while reviewing Péringuey's collection of type material (housed at SAMC), was unable to find a specimen which could be the type. Bischoff (1921) did not examine any specimens identified as this species and placed it as *incertae sedis*. It was suggested by Péringuey that this female was nocturnal, from the large eyes and pale colour, and perhaps was the opposite sex of *T. thisbe* or *T. semele*. I have seen no specimen which could possibly could be identified as *M. polyxene*. It is possible that *M. polyxene* is a species of *Tricholabiodes*, but in the absence of type material it is impossible to be sure from the description alone. Furthermore, the large eyes are atypical of *Tricholabiodes* females.

10. REFERENCES

André, E. 1895. Mutillides d' Australie nouvelles ou imparfaitement connues. *Mémoires de la Société Zoologique de France* 8:475-517.

André, E. 1896a. Notes pour servir a la connaissance des Mutilles paléarctiques et description de quelques espèces nouvelles. *Mémoires de la Société Zoologique de France* 9:261-277.

André, E. 1896b. Liste des Mutillides recueillis au pays des Somalis par M. le Cap. V. Bottego et description de deux espèces nouvelles. *Annali del Museo Civico di Storia Naturale Giacomo Doria* 17:281-284.

André, E. 1898. Étude sur les Mutillides du Muséum de Paris. *Annales de la Société Entomologique de France* 67:1-79.

André, E. 1899. Les Types des Mutillides de la collection O. Radoszkowski. *Annales de la Société Entomologique de France* 68:1-43.

André, E. 1901. Matérieux pour servir à la connaissance des Mutillides d'Afrique. *Zeitschrift für systematische Hymenopterologie und Dipterologie* 1:279-288, 305-352.

André, E. 1902. Hymenoptera, Fam. Mutillidae. *In*: P. Wytsman, *Genera Insectorum*. Bruxelles, 1(11):1-77.

André, E. 1903. 3e Sous-Genre - *Tricholabiodes*, Rad. *In*: Monographie des Mutillides d'Europe et d'Algérie. *Spècies des Hyménoptères d'Europe & d'Algérie* 8:167-175, pl. VIII.

André, E. 1909a. Diagnoses préliminaires des Espèces nouvelles de Mutillides. *Deutsche Entomologische Zeitschrift*, beiheft, 122-123.

André, E. 1909b. Mutillidae; Forschungereise im westlichen und zentralen Südafrika ausgeführt in den Jahren 1903-1905. *Denkschriften der Medizinisch-Naturwissenschaftlichen Gesellschaft zu Jena* 14:71-78.

André, E. 1910. Révision monographique des Mutillides de l'Egypte. *Mémoires de la Société Entomologique d' Egypte* 1:1-94.

Arnett, R.H., G.A. Samuelson, J.B. Heppner, G.M. Nishida, J.C. Watt and R.E. Woodruff. 1986. *The Insect and Spider Collections of the World.* E.J. Brill, Flora and Fauna Publications, Gainesville. p. 1-220.

Bayliss, P.S. and D.J. Brothers. 1996. Biology of *Tricholabiodes* in southern Africa, with a new synonymy and review of recent biological literature (Hymenoptera: Mutillidae). *Journal of Hymenoptera Research* 5:249-258.

Bischoff, H. 1920. Monographie der Mutilliden Afrikas. *Archiv für Naturgeschichte* 86 (A):1-830, pl. 1-7.

Brooks, D.R., R.T. O'Grady and E.O. Wiley. 1986. A measure of the information content of phylogenetic trees, and its use as an optimality criterion. *Systematic Zoology* 35:571-581.

Brothers, D.J. 1975. Phylogeny and classification of the aculeate Hymenoptera, with special reference to Mutillidae. *University of Kansas Science Bulletin* 50:483-648, 101 figs.

Brothers, D.J. 1983. Identity of four species of Mutillidae (Hymenoptera) described mistakenly as from Australia. *Journal of the Entomological Society of Southern Africa* 46:325-330.

Brothers, D.J. 1989. Alternative life-history styles of mutillid wasps (Insecta, Hymenoptera). *In*: M.N. Bruton (ed), *Alternative Life-History Styles of Animals*, p. 279-291, Kluwer Academic Publishers, Dordrecht, Netherlands.

Brothers, D.J. (MS). Critical evaluation of the species of Mutillidae and Bradynobaenidae: Apterogyninae (Hymenoptera) described by Péringuey, and other type material in the South African Museum, with description of a new genus.

Brothers, D.J. and J.M. Carpenter. 1993. Phylogeny of Aculeata: Chrysidoidea and Vespoidea (Hymenoptera). *Journal of Hymenoptera Research* 2:227-304.

Brown, G.W. (ed.) 1968. *Desert Biology: Special Topics on the Physical and Biological Aspects of Arid Regions*. New York Academic Press, New York. p. i-xvii, 1-635.

Carpenter, J.M. 1988. Choosing among multiple equally parsimonious cladograms. *Cladistics* 4: 291-296.

Cox, D.R. 1972. The analysis of multivariate binary data. *Applied Statistics* 21: 113-120.

Daly, H.V.. 1964. Skeleto-muscular morphogenesis of the thorax and wings of the honey bee *Apis mellifera* (Hymenoptera: Apidae). *University of California Publications in Entomology* 39:i-iv, 1-77.

Dalla Torre, C.G. de 1897. Catalogus Hymenopterorum hucusque descriptorum systematicus et synonimicus. 10:i-vii, 1-643.

Digby, P.G.N. and R.A. Kempton. 1991. *Multivariate Analysis of Ecological Communities*. Chapman and Hall, London. p. i-viii, 1-206.

Farris, J.S. 1983. The logical basis of phylogenetic analysis. *In*: N.I Platnick and V.A. Funk (eds), *Advances in Cladistics 2. Proceedings of the second meeting of the Willi Hennig Society*, p. 7-36. Columbia University Press, New York.

Farris, J.S. 1988. *Hennig86, version 1.5.* Program and documentation. Port Jefferson Station, New York.

Ferguson, W.E. 1962. Biological characteristics of the mutillid subgenus *Photopsis* Blake and their systematic values. *University of California Publications in Entomology* 27:1-92.

Fox, W.J. 1896. The Hymenoptera collected by Dr A. Donaldson Smith in Northeast Africa. *Proceedings of the Academy of Natural Sciences of Philadelphia* 28:547-549.

Gauld, I. and B. Bolton (eds). 1988. *The Hymenoptera*. British Museum (Natural History) and Oxford University Press, Oxford. p. i-xi, 1-332, pl. i-x.

Gess, F.W. and S.K. Gess. 1997. Islands of calm in windswept deserts: the use by aculeate wasps and bees of snail shells. *Proceedings of the joint Congress of the Entomological Society of Southern Africa (11th Congress) and the African Association of Insect Scientists (12th Congress)*. p. 221.

Gribodo, G. 1884. Viaggio ad Assab nel Mar Rosso, dei signori G. Doria ed O. Beccari con il R. Aviso "Esploratore" dal 16 Novembre 1879 al 26 Febbraio 1880. Imenoterri. *Annali del Museo Civico di Storia Naturale di Genova* 20:389-392.

Huber, J.T. and M.J. Sharkey. 1993. Structure. *In*: H. Goulet and J.T. Huber (eds), *Hymenoptera of the World: An identification guide to families*, p. 13-59. Canadian Communications Group, Ottawa, Canada.

International Commission on Zoological Nomenclature. 1985. *International Code of Zoological Nomenclature* (3rd ed.). International Trust for Zoological Nomenclature, London. p. i-xx, 1-338.

Invrea, F. 1932a. Mutillidi raccolti in Cirenaica e Tripolitania da Geo. C. Krüger. *Mémoires de la Société Entomologique d'Égypte* 11:64-84.

Invrea, F. 1932b. Spedizione scientifica all'Oasi de Cufra (Marcio-Luglio, 1931) Mutillidae e Chysididae. *Annali del Museo Civico di Storia Naturale di Genova* 55:457-465, pl. i-xii.

Invrea, F. 1936. Spedizione Zoologica del Marchese Saverio Patrizi nel Basso Giuba e nell'Oltregiuba Giugno-Agosto 1934. xii. Mutillidae e Chrysididae. *Annali del Museo Civico di Storia Naturale Giacomo Doria* 58:115-131.

Invrea, F. 1952. Missione biologica Sagan-Omo diretta del Prof. Edoardo Zavattari Hymenoptera: Apterogynidae e Mutillidae. *Rivista di Biologia Coloniale* 11:37-56.

Invrea, F. 1962. Missione 1957 del Prof. Giuseppe Scortecci in Migiurtinia (Somalia sett.). Hymenoptera: Apterogynidae e Mutillidae. *Atti della Società Italiana di Scienze Naturali* 98:320-327.

Invrea, F. 1965. Missione 1962 del Prof. Guiseppe Scortecci nell'Arabia meridionale. Hymenoptera: Apterogynidae, Mutillidae et Chrysididae. *Atti Societa Italiana di Scienze Naturali* 104:55-66.

Jolliffe, I.T. 1986. *Principal Component Analysis*. Springer, New York. p. i-xiii, 1-271.

Klug, J.C.F. 1829. Symbolae physicae seu icones et descriptiones Insectorum quae ex itinere per Africam borealem et Asiam et F.C. Hemprich et C.H. Ehrenberg studio novae aut illustratae redierunt. *Berolini. Hymenoptera, Decas* 1, tab iv, fig. 9.

Krzanowski, W.J. 1980. Mixture of continuous and categorical variables in discriminant analysis. *Biometrics* 36:493-499.

Lanham, U.N. 1951. Review of the wing venation of the higher Hymenoptera (suborder Clistogastra) and speculations on the phylogeny of the Hymenoptera. *Annals of the Entomological Society of America* 44:614-628.

Lelej, A.S. 1985. [The velvet ants (Hymenoptera, Mutillidae) of the USSR and neighbouring countries]. Nauka Leningrad. p. 1-268. (In Russian).

Lelej, A.S. 1995. To the knowledge of the velvet ants (Hymenoptera, Mutillidae) of Rajasthan, Western India. *Far Eastern Entomologist* 20:1-11.

Lelej, A.S. and O.N. Kabakov. 1980. [Towards the knowledge of wasps of the families Bradynobaenidae and Mutillidae (Hymenoptera) of the fauna of Afghanistan]. *Entomologicheskoe Obozrenie* 59:181-196. (In Russian).

Lelej, A.S. and O.N. Kabakov. 1981. Bradynobaenidae and Mutillidae (Hymenoptera) of Afghanistan. *Entomological Review* 59:141-156. (English translation of Lelej & Kabakov 1980).

Lelej, A.S. and P.G. Nemkov. 1997. Phylogeny, evolution and classification of Mutillidae (Hymenoptera). *Far Eastern Entomologist* 46:1-24.

Lovegrove, B. 1993. *The Living Deserts of Southern Africa*. Fernwood Press, Cape Town. p. 1-224.

Magretti, P. 1898. Imenotteri della seconda spedizione di don Eugenio dei principi Ruspoli nei paesi Galla e Somali. *Annali del Museo Civico di Storia Naturale* 19:37-42.

Magretti, P. 1899. Imenotteri dell'ultima spedizione del Cap. Bottego. *Annali del Museo Civico di Storia Naturale* 19:595-599.

Magretti, P. 1905. Materiali per la conoscenza della fauna Eritrea. Imenotteri. Pt I, Mutillidi. *Bullettino della Società Entomologica Italiana* 37:3-96.

Mantero, G. 1915. Contributo allo studio della fauna libica. Materiali raccolti nelle zone di Misurati e Homs (1912-13) dal Dott. Alfredo Andreini, Capitano Medico. Imenotteri. *Museo Civico di Storia Naturale, Genoa* 46:305-331.

Matsuda, R. 1970. Morphology and evolution of the insect thorax. *Memoirs of the Entomological Society of Canada* 76:1-430.

Mayr, E. 1969. *Principles of Systematic Zoology*. McGraw - Hill, New York. p. i-xi, 1-428.

Mayr, E. and P.D. Ashlock. 1991. *Principles of Systematic Zoology* (2nd ed). McGraw-Hill, Inc, New York. p. i-xx, 1-475.

Miyamoto, M.M. 1985. Consensus cladograms and general classifications. *Cladisitcs* 1:186-189.

National Imagery and Mapping Agency. 1997. *Geonet server.* http://164.214.2.59/gns/html/index.html.

Neff, N.A. and L.F. Marcus. 1980. *A Survey of Multivariate Methods for Systematics*. American Museum of Natural History, New York. p. i-x, 1-243.

Nichols, S.W. (ed). 1989. *The Torre-Bueno Glossary of Entomology*. The New York Entomological Society and the American Museum of Natural History, New York. p. i-xvii, 1-840.

Nixon, K.C. 1992. *Clados, version 1.2.* Program and documentation. Ithaca, New York.

Nixon, K.C. 1995. *Dada, version 1.0.* Program and documentation. Ithaca, New York.

Péringeuy L. 1898. Description of some new or little known South African Mutillidae in the collection of the South African Museum. *Annals of the South African Museum* 1:33-94.

Pope, G.C. 1995. The influence of climate and geography on the biocultural evolution of the Far Eastern Hominids. *In*: E.S. Vrba, G.H. Denton, T.C. Partridge and L.H. Burckle (eds), *Paleoclimate and Evolution, with Emphasis on Human Origins*, p. 493-506. Yale University Press, London.

Radoszkowski, O. 1876. Compte-rendu des Hyménoptères recueillis en Egypte et Abyssinie en 1873. *Horae. Societatis Entomologicae Rossicae* 12:138-140.

Radoszkowski, O. 1885. Revision des armures copulatrices des mâles de la famille de Mutillides. *Horae Societatis Entomologicae Rossicae* 19:3-49, pl. i-ix.

Radoszkowski, O. 1887. Faune hyménoptèrologique transcaspienne, II. *Horae Societatis Entomologicae Rossicae* 21:99-100.

Radoszkowski, O. 1893. Faune hyménoptèrologique Transcapienne, V. *Horae Societatis Entomologicae Rossicae* 27:73-76.

Rohlf, F.J. 1993. *NTSYS-pc - Numerical Taxonomy and Multivariate Analysis System (version 1.80)*. Exeter Software, New York.

Schuster, R.M. 1958. A revision of the sphaeropthalmine Mutillidae of America north of Mexico, II. *Entomologica Americana* (NS) 37:1-130, pl 1-7.

Sichel, J. and O. Radoszkowski. 1869. Essai d'une monographie des Mutilles de l'Ancien Continent. *Horae Societatis Entomologicae Rossicae* 6:139-309.

Skorikov, A. 1935. Zur Mutilliden Fauna Zentral-asiens. *Travaux de la filiale de l'URRS au Tadjikistan* 5:257-349. (In Russian with German summary).

Sneath, P.H.A. and R.R. Sokal. 1973. *Numerical Taxonomy*. W.H Freeman and Company, San Francisco. p. i-xvi, 1-573.

Sokal, R.R. and P.H.A. Sneath. 1963. *Principles of Numerical Taxonomy*. W.H. Freeman, San Francisco. p. i-xv, 1-573.

Stevens, P.F. 1991. Character states, morphological variation and phylogenetic analysis: A review. *Systematic Botany* 16:553-583.

Suárez, F.J. 1963. Hymenoptera Tiphiides, Apérogynides et Mutillides recoltés par J. Mateu dans I' Ennedi et au Tchad. *Bulletin of the Institute of France* 25:922-925, 3 figs.

Suárez, F.J. 1967. Diagnosis preliminares de nuevas especies de *Tricholabioides* Rad. (Hym. Mutillidae). *Eos. Revista Española de Entomologia* 42:561-573.

Suárez, F.J. 1977. Dos nuevos mutílidos etiópicos y propuesta'de un género nuevo para uno de ellos (Hymenoptera, Mutillidae). *Nouvelle Revue d' Entomologie* 7:213-223, 5 figs.

Suárez, F.J. 1990. Notas sobre algunos *Tricholabioides* (Hymenoptera, Mutillidae). *Eos. Revista Española de Entomologia* 65:125-188, 34 figs.

Thiele, K. 1993. The holy grail of the perfect character: The cladistic treatment of morphometric data. *Cladisitcs* 9: 275-304.

Williamson, M.H. 1978. The ordination of incidence data. *Journal of Ecology* 66:11-920.

Zavattari, E. 1910. Catalogo della Mutille del Museo Zoologico di Napoli. *Annuario R. Museo Zoologico della R. Universita di Napoli* 9:3.

APPENDIX I. Complete list of all species of *Tricholabiodes* and their distributions.

acer sp. nov. ♂ ..... Namibia

aegyptiacus (Radoszkowski, 1876). ♀ ..... Egypt

alveolus sp. nov. ♂ ..... South Africa

andrei Bischoff, 1920. ♂ ..... South Africa

arabicus Suárez, 1967. ♂ ..... Egypt, Niger, Ethiopia, Djibouti, Somalia
Saudi Arabia, Yemen, Oman

asiaticus Radoszkowski, 1885. ♀ & ♂ ..... Turkmenistan, Tajikistan
Uzbekistan, Pakistan, Iran

bactrianus Suárez, 1967. ♂ ..... Turkmenistan, Iran

beludzhistanus Lelej, 1985. ♂ ..... Iran

brothersi sp. nov. ♂ ..... Iraq, Oman, United Arab Emirates

carinifer Bischoff, 1920. ♀ & ♂ ..... Angola, Namibia, South Africa

chloroticus (Gribodo, 1884). ♂ ..... South Yemen

concavus sp. nov. ♂ ..... Namibia, Botswana, South Africa

convexus sp. nov. ♂ ..... Namibia

craspedopygus Suárez, 1967. ♀ ..... Ethiopia

denticrus Bischoff, 1920. ♂ ..... Djibouti

denticulatus sp. nov. ♂ ..... South Africa

disgregus sp. nov. ♂ ..... Namibia

femoralis sp. nov. ♂ ..... United Arab Emirates, Oman

ferrugineus sp. nov. ♂ ..... Saudi Arabia

garamantis Suárez, 1967. ♂ ..... Algeria, Niger

imbellis (André, 1895). ♂ ..... Namibia, South Africa

indistinctus sp. nov. ♂ ..... Saudi Arabia

inornatus sp. nov. ♂ ..... Angola, Namibia

israeliticus Suárez, 1967. ♂ ..... Israel

lividus André, 1909a. ♀ & ♂ ..... Angola, Namibia, South Africa

longicarinatus sp. nov. ♂ ..... Namibia, South Africa

luridus sp. nov. ♂ ..... United Arab Emirates, Oman

mandibularis Lelej, 1985. ♂ ..... Iran

marmaricus Invrea, 1932b. ♂ ..... Tunisia, Libya

mendax (André, 1898). ♀ ..... Djibouti

niloticus niloticus Suárez, 1967. ♂ ..... Mauritania, Libya, Niger, Nigeria, Sudan Ethiopia, Israel, Saudi Arabia, Iran

niloticus persicus Suárez, 1967. ♂ ..... Iran

nodosus Bischoff, 1920. ♂ ..... Namibia, South Africa

nonveilleri Suárez, 1977. ♂ ..... Senegal, Cameroon

nuristanus Lelej, 1980. ♂ ..... Afghanistan

nursei Lelej, 1995. ♀ & ♂ ..... India

palaestinensis Suárez, 1967. ♂ ..... Israel

pallidicornis Bischoff, 1920. ♂ ..... Tunisia, Algeria, Libya Mauritania, Niger, Chad, Togo

pallidior Bischoff, 1920. ♂ ..... Namibia, South Africa

pallidus Lelej, 1985. ♂ ..... Iran, Pakistan

parallelus sp. nov. ♂ ..... Kenya

paulocellatus sp. nov. ♂ ..... South Africa

pedunculatoides Bischoff, 1920. ♂ ..... Ethiopia, Uganda, Kenya, Somalia

pedunculatus (Klug, 1829). ♂ ..... Egypt, Saudi Arabia, Oman

petiolatus sp. nov. ♂ ..... Angola, Namibia

protuberans sp. nov. ♂ ..... Oman

recurvatus sp. nov. ♂ ..... Pakistan

saharicus Suárez, 1967. ♂ ..... Morocco, Mauritania, Algeria Tunisia, Libya

scorteccii Invrea, 1965. ♂ ..... Yemen, South Yemen

stigmaticus Bischoff, 1920. ♂ ..... South Africa, Namibia

semistriatus (Klug, 1829). ♀ ..... Egypt, Djibouti, Somalia, Cameroon

signatipennis (André, 1901). ♂ ..... South Africa

sinuatus sp. nov. ♂ ..... Somalia

somalicus Suárez, 1967. ♂ ..... Somalia

stenothorax Suárez, 1967. ♀ ..... Central Sahara

sudanensis Suárez, 1967. ♂ ..... Libya, Egypt, Mali, Niger, Chad Sudan, Nigeria, Cameroon, Djibouti Ethiopia, Eritrea, Saudi Arabia

testaceus Bischoff, 1920. ♂ ..... Namibia, South Africa

tenuistriatus Suárez, 1967. ♀ ..... Cameroon

tharensis Lelej, 1995. ♀ & ♂ ..... India

thisbe (Péringuey, 1898). ♂ ..... Namibia, South Africa

thisboides sp. nov. ♂ ..... Angola, Namibia, South Africa

tortilis sp. nov. ♂ ..... Namibia

trochantalis sp. nov. ♂ ..... United Arab Emirates, Oman

APPENDIX II. Characters rejected for the derivation of the final cladogram.

The following characters were considered but for various reasons rejected during the construction of the final cladogram. Some characters varied gradually, making them impossible to code for inclusion into the final character list. Colour and sculpture, were difficult, at times impossible, to polarize. These characters, besides showing a high degree of intraspecific variation, often showed two or more states in the outgroup, *Dasylabroides*. Other characters, when included in an initial cladogram, showed a high incidence of homoplasy which lessened their usefulness.

Continuous quantitative characters were not included in the final cladogram. As already described under the phenetic analysis (Chapter 6.2. Explanation of procedures), it was impossible to code these characters. To be able to include continuous quantitative characters in a phylogenetic study they have to be broken into states, so that the primitive state can be identified and all states appropriately coded. When the standardized values or ratios for each character, for all species, were plotted on a linear graph, the values always formed a continuous sequence, without a single missing value between the extremities. Therefore, the characters could not be broken into states.

Colour, usually a useful character for the recognition of mutillid wasps, is not suitable as a character for recognizing or identifying species of *Tricholabiodes*. Intraspecifically, coloration is extremely variable, particularly in species found in several different geographical areas. Ferguson (1952), studying the influences of humidity and temperature on coloration of the mutillid subgenus *Photopsis* Blake, concluded that temperature and humidity have their greatest impact when imposed between prepupal and early pupal stages. Development of the pupa occurring at average temperatures (±23°C) usually results in more extensive and intensive darkening of the integument, but at high temperatures (≥30°C), the reverse is true (Ferguson 1982).

Punctation, although it helped with species identification, is not always consistent within a species. Often, there is a large variation in puncture density and size, particularly on T2. Furthermore, punctation is an extremely difficult character to polarize, and it is a character for which it is almost impossible to determine the plesiomorphic state, particularly with the outgroup, *Dasylabroides*, and the tribe Sphaeropthalmini, showing a large amount of variation with no consistent trend.

Scrobal carina absent (primitive) or present (derived). Although the two states, absence and presence, can be defined reasonably unequivocally; the presence of the carina can be further divided into additional

states which cannot be unequivocally defined. By recognizing only two states, absence and presence, and neglecting the separate derivations of the derived state, shape and length of the carina, is incorrect.

Compound eye with ommatidia individually distinct (primitive) or with entire surface smooth and ommatidia indistinct (derived). Although the two states can be defined reasonably unequivocally, the derived state has occurred, in the initial and final cladogram (fig. 8), on many occasions, thus not delimiting any groupings.

Setae on dorsal surface of clypeus longer than height of clypeus (primitive) or subequal to clypeal height (derived). This character is fairly variable between species and provides no information on groupings. It is somewhat equivocal in that the degree of modification of setae length varies, making discrimination between the states difficult in many cases.

Areola same length as neighbouring areae (primitive); shorter than neighbouring areae (derived #1) or longer than neighbouring areae (derived #2). Although this character can be defined reasonably unequivocally, it is fairly variable within species, and both derived states have occurred, in the initial and final cladogram, on many parallel occasions, thus not delimiting any groupings.

Structure of forewing venation: the veins surrounding the third submarginal cell and the accessory vein are tubular, spectral or nebulous. The difference between the veins is somewhat equivocal in that the degree of pigmentation varies, depending on the light source used while viewing the wing through a dissecting microscope, thus making discrimination between the states difficult in many cases.

The primitive state of the number of rows of spines on the ventral surface of the metabasitarsus cannot be determined. Within *Dasylabroides* and the tribe Sphaeropthalmini, several species and genera, respectively, exhibit a large amount of variability, making recognition of the plesiomorphic state difficult, making it impossible to polarize the character.

S1 longitudinal median carina continuous (primitive); anteriorly continuous, posteriorly absent or irregular (derived #1); anteriorly triangulate (derived #2); interrupted (derived #3); absent but median area irregular (derived #4) or median area entirely smooth (derived #5). The difference between the carina is equivocal in that the degree of sclerotization of the carina varies, making discrimination between the states difficult in many cases.

Posterior margin of hypopygium convex (primitive) or straight (derived). This character is fairly variable between species and provides no information on groupings. It is somewhat equivocal in the degree of convexity, making discrimination between the states difficult in many cases.

The arrangement and length of the setae on the paramere is impossible to separate into states. Continuous variation between species makes it impossible to separate this character into, and to discriminate between, states.

APPENDIX III. Coded variables used in the final cladistic analyses of *Tricholabiodes*, based on characters and states used in the descriptions; all refer to adult males. Polarity was determined through outgroup comparison. In order to permit this analysis to stand on its own, all variables and states are specified here. The format adopted for character layout is from Brothers & Carpenter (1993).

0. Head with sides behind compound eyes: Subparallel, distinct from weakly convex posterior margin (figs 10c-d) = 0. Slightly convergent posteriorly and gradually merging with weakly convex posterior margin (fig. 10b) = 1. Strongly convergent posteriorly and merging with weakly convex posterior margin (fig. 10a) = 2.
1. Surface between foveola and toruli, with longitudinal groove (first variable): Shallow (or modified differently from State 1) = 0. Deep = 1.
2. Surface between foveola and toruli, with longitudinal groove (second variable): Shallow (or modified differently from State 1) = 0. Absent = 1.
3. Anterior margin of antennal tubercle: Simple = 0. Ridged = 1.
4. Vertex: Slightly convex with side laterally of lateral ocellus sloping slightly towards compound eye = 0. Strongly convex with side laterally of lateral ocellus sloping strongly towards compound eye = 1.
5. Ocelli: Small, ocellocular distance at least 1.5 X > width of lateral ocellus = 0. Large, ocellocular distance < width of lateral ocellus = 1.
6. Free border (ventral margin) of clypeus (first variable): Convex (or modified differently from States 1, 2 or 3) = 0. Convex with very slight protuberance on either side of midline (fig. 12g) = 1. Convex with a rounded tubercle on each either of midline (fig. 12h) = 2. Convex with a longitudinally elongate tubercle on each side of midline = 3. NONADDITIVE
7. Free border (ventral margin) of clypeus (second variable): Convex (or modified differently from State 1) = 0. Convex with a triangulate tubercle on each side of midline, below tubercle declivity bordered laterally by a carina = 1.
8. Free border (ventral margin) of clypeus (third variable): Convex (or modified differently from State 1) = 0. Flat to slightly posteriorly concave = 1.
9. Free border (ventral margin) of clypeus (fourth variable): Convex (or modified differently from State 1) = 0. Strongly protruding, broadly transverse and truncated (fig. 12a) = 1.
10. Free border (ventral margin) of clypeus (fifth variable): Convex (or modified differently from States 1, 2 or 3) = 0. With mesal area slightly protruding in a weak subrounded arch, arch not upwardly flexed (fig. 12d) = 1. With mesal area strongly protruding in a slightly upwardly flexed arch (fig. 12c) = 2. With mesal area strongly protruding, subsquare and

slightly upwardly flexed (fig. 12b) = 3.

11. Free border (ventral margin) of clypeus (sixth variable): Convex (or modified differently from State 1) = 0. With mesal area slightly protruding and truncated straight = 1.
12. Free border (ventral margin) of clypeus (seventh variable): Convex (or modified differently from States 1 and 2) = 0. With mesal area slightly protruding in a weak subrounded arch, arch mesally notched forming a weak denticle on each side of midline = 1. With mesal area strongly protruding in an arch, arch mesally notched forming a triangulate protuberance on each side of midline (fig. 12f) = 2.
13. Central portion of clypeus: Raised and slightly convex = 0. Depressed = 1.
14. Clypeus with setae: Evenly distributed = 0. Densely clumped on central portion = 1.
15. Mandible (first variable): Higher than thick (or thicker than high) = 0. Dorso-ventrally dilated = 1.
16. Mandible (second variable): Higher than thick (or dorso-ventrally dilated) = 0. Thicker than high = 1.
17. Dorsal rim of mandible (first variable): Entire length with weak carina (or modified differently from State 1) = 0. Basal half with weak carina, carina on apical half absent = 1.
18. Dorsal rim of mandible (second variable): Entire length with weak carina (or modified differently from State 1) = 0. Basal half with strong carina, carina on apical half weak = 1.
19. Dorsal rim of mandible (third variable): Entire length with weak carina (or modified differently from State 1) = 0. Entire length with an enlarged vertical flange ending at junction between middle and inner tooth, greatest height of flange above ventral tooth, apex of flange subrounded = 1.
20. Middle and inner mandibular teeth: Separate (fig. 11c) = 0. Adjacent (fig. 11b) = 1.
21. Inner mandibular tooth with apex: Truncate (fig. 11d) = 0. Subrounded (fig. 11b) = 1. Acute (fig. 11c) = 2.
22. Mesal margin of mandible: Smooth = 0. Toothed = 1.
23. Ventral margin of mandible: Strongly excised, subtending tooth well developed = 0. Slightly excised, subtending tooth minute = 1.
24. Area on superior basal half of lateral surface of mandible: Simple = 0. With dense ovate pubescent patch present = 1.
25. Area on midlength of lateral surface of mandible: Simple = 0. With strong vertical carina present = 1.
26. Anterior surface of scape: With one longitudinal carina = 0. With two longitudinal carinae = 1.
27. Anterodorsal margin of pronotum: Strongly convex = 0. Slightly convex = 1.

28. Humeral angles of pronotum (first variable): Subrounded (or modified differently from State 1) = 0. Subsquare = 1.
29. Humeral angles of pronotum (second variable): Subrounded (or modified differently from State 1) = 0. Strongly acute = 1.
30. Anterior portion of lateral surface of prothorax: Reticulate = 0. Punctate = 1.
31. Posterolateral corner of mesoscutum: Raised as an angulate tooth = 0. Flat = 1.
32. Dorsellum laterally: Simple = 0. Ridged = 1.
33. Mesepisternal groove: Absent = 0. Present = 1.
34. Anteromesal surface of mesosternum (first variable): Each side of midline with a pair of conical protuberances (or modified differently from State 1) = 0. Simple = 1.
35. Anteromesal surface of mesosternum (second variable): Each side of midline with a pair of conical protuberances (or modified differently from State 1) = 0. Swollen with transverse ridges = 1.
36. Second submarginal cell: Anteriorly sessile (fig. 13a) = 0. Anteriorly acute and barely reaching marginal cell (not petiolate) (fig. 13b) = 1. Anteriorly petiolate (fig. 13c) = 2.
37. Outer lateral margin of ventral surface of mesocoxa: Unarmed = 0. Weakly carinate = 1.
38. Mesal margin of mesocoxa (first variable): Unarmed = 0. With short triangular protuberance approximately 0.25 X length of coxa = 1.
39. Mesal margin of mesocoxa (second variable): Unarmed = 0. With longitudinal carina approximately 0.5 X length of coxa = 1.
40. Mesofemur: With greatest width at midlength (fig. 15a) = 0. With greatest width in basal third, dorsal and ventral margin subparallel (fig. 15b) = 1.
41. Anteriorly on basal half of mesofemur: Simple = 0. Shallowly concave = 1.
42. Posteriorly on basal half of mesofemur: Simple = 0. With slight elongate protuberance = 1.
43. Posteriorly at midlength of mesofemur: Convex = 0. Concave = 1.
44. Distal half of mesotibia (first variable): Simple, in cross-section oval (or modified differently from State 1) = 0. Laterally enlarged, in cross-section fusiform = 1.
45. Distal half of mesotibia (second variable): Simple, in cross-section oval (or modified differently from State 1) = 0. Anterior and posterior surface shallowly flattened, ventral margin with weak carina, in cross-section mid tibia subtriangular = 1.
46. Macrosetae of mesotibia: Shorter than shorter spur = 0. Longer than shorter spur = 1.
47. Longer mesotibial spur (first variable): Straight = 0. Slightly arched towards the midline, bow-like = 1.
48. Mesobasitarsus (first variable): Straight = 0. Curved ventrally = 1.

49. Mesobasitarsus (second variable): Straight = 0. Curved anteriorly = 1.
50. Anterior and posterior surfaces of mesobasitarsus: Convex = 0. Slightly concave = 1.
51. Mesal margin of metacoxa (first variable): With longitudinal carina > 0.6 X length of coxa (or modified differently from States 1 and 2) = 0. With longitudinal carina < 0.5 X length of coxa (fig. 16f) = 1. Mesal margin simple (fig. 16a) = 2. NONADDITIVE
52. Mesal margin of metacoxa (second variable): With longitudinal carina > 0.6 X length of coxa (or modified differently from State 1) = 0. With longitudinal carina < 0.5 X length of coxa, carina posteriorly slightly angulated (fig. 16g) = 1.
53. Mesal margin of metacoxa (third variable): With longitudinal carina > 0.6 X length of coxa (or modified differently from State 1) = 0. Ventrally enlarged and strongly carinate, in cross-section subtriangulate = 1.
54. Mesal margin of metasoma (fourth variable): With longitudinal carina > 0.6 X length of coxa (or modified differently from State 1) = 0. With large dentiform flange posteriorly (fig. 16e) = 1.
55. Mesal margin of metacoxa (fifth variable): With longitudinal carina > 0.6 X length of coxa (or modified differently from State 1) = 0. With enlarged, slightly rounded lobule, apex of lobule weakly sclerotised (fig. 16i) = 1.
56. Mesal margin of metacoxa (sixth variable): With longitudinal carina > 0.6 X length of coxa (or modified differently from States 1, 2 or 3) = 0. With triangular protuberance < 0.40 X length of coxa, protuberance continuous with contour of ventral surface of coxa (fig. 16b) = 1. With triangular protuberance > 0.5 X length of coxa, protuberance continuous with contour of ventral surface of coxa (fig. 16c) = 2. With large protruding flange at midlength (fig. 16d) = 3.
57. Mesal margin of metacoxa (seventh variable): With longitudinal carina > 0.6 X length of coxa (or modified differently from States 1 or 2) = 0. With short, weakly sclerotised triangular protuberance < 0.30 X length of coxa, protuberance separate from contour of ventral surface of coxa =1. With arched, slightly sclerotised ridge < 0.30 X length of coxa, ridge separate from contour of ventral surface of coxa = 2.
58. Mesal margin of metacoxa (eighth variable): With longitudinal carina > 0.6 X length of coxa (or modified differently from State 1) = 0. With rounded protuberance, apical margin slightly sclerotised and upturned, > 0.6 X length of coxa = 1.
59. Posteromedial margin of metacoxa: Simple = 0. With tuft of setae = 1.
60. Metatrochanter: Simple (fig. 14a) = 0. Slightly swollen ventrally (fig. 14b) = 1.
61. Metafemur with macrosetae (first variable): Shorter than shorter spur (or modified differently

from States 1, or 2) = 0. Longer than shorter tibial spur = 1. Longer than longer tibial spur = 2.

62. Metafemur with macrosetae (second variable): All subequal in length, shorter than shorter spur (or modified differently from State 1) = 0. Setae increasing in length distally with distal setae longer than shorter tibial spur = 1.
63. Ventral surface of metafemur: With macrosetae evenly distributed = 0. With macrosetae densely clumped = 1.
64. Metatibial macrosetae: In subequal amounts = 0. On posterior surface twice as dense as setae on anterior surface = 1.
65. Metatibial macrosetae: Shorter than shorter spur = 0. Longer than shorter spur = 1. Longer than longer spur = 2.
66. Longer metatibial spur: Straight = 0. Subsigmoidal = 1.
67. Metabasitarsus: Straight = 0. Curved slightly anteriorly = 1.
68. Metabasitarsus with macrosetae: Absent = 0. Shorter than shorter metatibial spur = 1. Longer than shorter metatibial spur = 2.
69. Centrally on S2: Convex = 0. Concave = 1.
70. S2 with setae: Evenly distributed, shorter than shorter mesotibial spur = 0. Evenly distributed, longer than shorter mesotibial spur = 1. More dense centrally than laterally, longer than shorter mesotibial spur = 2.
71. Felt lines on S2: Absent = 0. Present = 1.
72. S2 anterior mesal area: Unarmed = 0. With slight protuberance < 0.15 X length of sternum = 1. With longitudinal carina > 0.20 X length of sternum = 2. With strong carina > 0.5 X length of sternum = 3.
73. Posterolateral area of S2: Simple = 0. With diagonal transverse tubercles = 1.
74. Setae on posterior margin of S2: Uniformly arranged = 0. Increasing in density towards the midline = 1.
75. S4-S6: With setae decumbent = 0. With subequal amounts of decumbent and erect setae = 1. With setae clumped and erect = 2.
76. Posterior margin of hypopygium: Entire (fig. 17a) = 0. Shallowly concave (fig. 17b) = 1. Shallowly notched = 2. Deeply notched (fig. 17c) = 3.
77. Mesal area of hypopygium: Simple = 0. With longitudinal depression = 1.
78. Volsellae shape (first variable): Conical and straight (or modified differently from State 1) = 0. Conical and slightly mesally curved = 1.
79. Volsellae shape (second variable): Conical and straight (or modified differently from State 1) =

0. Oval = 1.

80. Ventral surface of volsellae (first variable): With a cavity, opening of cavity more ventral than lateral (or modified differently from State 1) = 0. With a cavity, opening of cavity more lateral than ventral = 1.

81. Ventral surface of volsellae (second variable): With a cavity, opening of cavity more ventral than lateral (or modified differently from State 1) = 0. With cavity absent = 1.

82. Mesal margin of volsella: Simple = 0. With a slightly rounded protuberance at midlength = 1.

83. Parapenial lobe (first variable): > 1/4 length of penis valve, broad and straight = 0. > 1/4 length of penis valve, thin and slightly curved towards the midline = 1.

84. Parapenial lobe (second variable): > 1/4 length of penis valve, broad and straight = 0. < 1/4 length of penis valve = 1. Absent = 2.

85. Penis valve with apex of ventral margin bearing: One tooth = 0. Two teeth = 1. Three teeth = 2.

86. Apical tooth of penis valve: Long = 0. Short = 1.

87. Ventral margin of penis valve, at midlength: With a rounded lobe = 0. Smooth = 1.

88. Penis valve with dorsal lobe: Posteriorly produced = 0. Slightly reduced and rounded, not posteriorly produced = 1. Much reduced or lost = 2.

89. Mesal margin of paramere, at midlength: Unarmed = 0. With lobe rounded = 1. With lobe subsquare = 2. NONADDITIVE

90. Paramere (d.v.): Narrow = 0. Broad = 1.

91. Sides of paramere (d.v.): Tapering towards the apex = 0. Subparallel, except apical 1/4 might be tapering towards the apex = 1. Diverging towards the apex = 2.

92. Apical 1/3 of paramere (d.v.): Recurved = 0. Straight, linear with basal 2/3 of paramere = 1.

APPENDIX IV. Data matrix for final cladistic analysis of species of *Tricholabiodes* using the coded characters as in Appendix III. Characters 6, 51 and 89 are nonadditive. The first variable is 0 (not 1) and the last is 92 (not 93).

ancestor

0000000000 0000000000 0000000000 0000000000 0000000000 0000000000
0000000000 0000000000 0000000000 000

T. beludzhistanus

2000010000 0010000000 0100000100 0010100000 0000000000 0200000000
0000000010 0000000001 0001011101 000

T. niloticus niloticus

2000010000 0000000000 0200000000 0000100000 0000000000 0200000000
0000000010 0120000010 0100211100 000

T. indistinctus

2000011000 0000000100 0200000000 0010100000 0000000000 0000000000
0000000010 0020000100 0100211100 000

T. luridus

2000010000 0000000000 0100000000 0010100000 0000000010 0000000000
0000000010 0010000101 0101011100 110

T. scorteccii

1000010000 0000000100 0200000010 0010100000 0000000000 0200000000
0000000000 0020000110 0100111100 000

T. arabicus

2000010000 0000000000 0100000000 0010100000 0000000000 0100000000
0000010010 0120000010 0100100100 000

T. pallidicornis

1000010000 0000000000 0100000000 0000100000 0000000001 0200000000

0011000010 0000000110 0100111100 000

T. pallidior

1010010000 1000000000 1100000000 0010002000 0000000000 0200000000
0000000000 0000011000 0100000010 001

T. tortilis

1100010000 3000000000 1100000000 0000001000 0000000000 0200000000
0000000000 0000011000 0100000010 000

T. petiolatus

1000010000 3000000000 1100000000 0000002000 0000000000 0200000000
0000000010 0000011000 0100000010 001

T. imbellis

1000010000 3000000000 1100000000 0000002000 0000001000 0200000000
0000000000 0000021000 0100000010 000

T. lividus

0000010000 2000000000 1100000100 0000001000 0000000000 0000000000
0000000000 0000001000 0100000010 011

T. inornatus

1100010000 1000000000 1100000000 0000001000 0000000000 0000000000
0000000010 0000011000 0100000010 000

T. testaceus

2000010000 1000000000 1100000000 0000002000 0000000000 0000000000
0000000000 0000001100 0100000010 000

T. acer

1000010000 3000000000 1100000000 0000001000 0000000000 0000000000
0000000000 0020011000 0100000010 000

T. concavus

1000010000 2000000000 1100000000 0010001000 0000000000 0200000000
0000000000 0020001000 0100000010 001

T. denticulatus

1000100000 2000000000 1101000100 1111002000 0000000000 0000000000
0000000000 0000000000 0100000010 000

T. mandibularis

0000010010 0000100001 0200000110 0001100000 1101010100 0100000000
0100010011 0120000001 0001011100 111

T. disgregus

0001000001 0001001000 1110001001 0011010001 0000100100 0000000001
0000000000 0001021001 0000000010 021

T. thisbe

1100012000 0000000000 1100000000 0011100000 0000000000 0200000000
0000000000 0020000001 0001000120 000

T. thisboides

1100012000 0000000000 1100000000 0011100000 0000000000 0200000000
0000000000 0020000001 0001010110 001

T. alveolus

1100012000 0000000000 1100000000 0011100000 0000000000 0200000000
0000000000 0020000001 1001011100 000

T. paulocellatus

0100000000 0020000000 1100000100 0011100000 0000000000 0200000000
0000000000 0020000001 0001011110 001

T. longicarinatus

1100012000 0000000000 1100000000 0011100000 0000000000 0100000000

0000000000 1030000001 0001011100 001

T. bactrianus

1000012000 0000000000 1100000000 0001100000 0000001000 0200000000
0200020010 0000000001 0001011100 100

T. garamantis

1000012000 0000000000 0100000000 0010100000 0000000000 0200000000
0000000000 0000000001 0001011000 000

T. convexus

0000012000 0000000000 1100000100 0011100000 0000000100 0001000000
0000000000 0020000101 0001020100 001

T. nodosus

1000101000 0000000000 1101000100 1100100000 0000000000 0000000000
0000000000 0000000000 0100000010 000

T. sudanensis

0100012000 0000000000 0000000000 0010100000 1011000000 0000001000
1000000000 1020113101 1001001100 000

T. femoralis

1100012000 0000000000 0000000000 0001100000 1010000000 0000001000
1000000010 0010003001 0101011100 000

T. trochantalis

1100012000 0000000000 0000000100 0000100000 1011000000 0000001000
1000000010 0000013101 0101001100 000

T. pedunculatus

1000012000 0000000000 0000000000 0010100000 0000000000 0000001000
1000000000 0000003101 0101001100 000

T. palaestinensis

0000012000 0000000100 0000000000 0010100000 0000000000 0000001000
1000000010 1000013101 0101001100 000

T. protuberans

0100012000 0000000000 0000000100 0011100000 0001000000 0000003000
0000000000 1020001101 0101001100 000

T. chloroticus

1100012000 0000000100 0000000000 0000100000 0011000100 0000000010
1000021020 0000013001 0101001100 000

T. brothersi

1100000100 0000010010 0100110000 0001100110 0000000100 0000002000
0100100021 0020000001 0000001100 100

T. asiaticus

1000010000 0010000000 0200000100 0010100000 0000000000 0000000200
0000000000 0120000001 0001021101 000

T. ferrugineus

1000010000 0010000000 0100000010 0000100000 0000000000 0000000000
0100000000 0120010001 0010111100 100

T. pallidus

2000011000 0000000000 0100000100 0010100000 0000000000 0000001000
0000000000 0120000101 0001011102 000

T. signatipennis

0100010000 0020000000 1100000000 0011100000 0000000000 0000000000
0000000000 0120000001 0001001100 000

T. carinifer

1100012000 0000000000 1100000010 0011000000 0000000000 0000000000

0000000000 1020010101 0001001100 000

T. andrei

0100010000 0020000000 1100000010 0011100000 0000000000 0100000000
0000000000 0120000001 0001000100 001

T. stigmaticus

1100010000 0020000000 1100000000 0011100000 0000000000 0000000000
0000000000 0120000001 0001001100 001

T. recurvatus

1100010000 0010000000 0000000100 0000100000 0000001000 0100000000
0000020010 0000000001 0101011100 100

T. saharicus

1000010000 0100000000 0200000000 0010100000 0000000000 0010000000
0000000010 0000000101 0110111100 100

T. tharensis

2000010000 0010000000 0200000000 0010100000 0000000000 0000000000
0000000000 0000000101 0001001101 000

T. pedunculatoides

0000013000 0000000100 0000000010 0010100000 0011000000 0000002000
1000000010 0020000101 0101001100 000

T. parallelus

0000012000 0000000000 0000000010 0010100000 0010000000 0000000100
0000000010 0020000101 0101001100 000

T. nonveilleri

0100012000 0000000000 0100000100 0011100000 0000000000 1000100000
0000000011 0020100101 0010001100 100

T. sinuatus

0100013000 0000000000 0000000000 0010100000 0010000010 0000002000
1000001110 1020002101 0101001100 000

T. marmaricus

1100010000 0020000000 0100000100 0100100000 0000000010 0000001000
0000000010 0000000100 0111000100 000

T. nursei

0100010000 0010000000 0200000000 1000100000 0000000000 0000000000
0100000000 2100010001 0001001101 000

APPENDIX V. Ratios used in the initial phenetic analysis of *Tricholabiodes*, based on characters used in the descriptions; all refer to adult males.

0. Head width:length
1. Head width:mesosomal width
2. Head width:vertex width
3. Head length:compound eye length
4. Vertex length:width
5. Vertex width:frons width
6. Median ocellus length:width
7. Interocellar distance:ocellocular distance
8. Clypeus height:width
9. Mandibular height across basal tooth:mandibular height at base
10. Scape length:first flagellomere length
11. Second flagellomere length:first flagellomere length
12. Second flagellomere length:third flagellomere length
13. Mesosoma length:width
14. Pronotum width:mesosoma width
15. Mesoscutum length:width
16. Mesoscutum width:pronotum width
17. Pterostigma length:anterior margin of marginal cell length
18. Marginal cell length:width
19. Marginal cell length:second submarginal cell length
20. Second submarginal cell length:discoidal cell length
21. Shorter mesotibial spur length:longer mesotibial spur length
22. Shorter metatibial spur length:longer metatibial spur length
23. Longer metatibial spur length:basitarsus length
24. Metasoma length:width
25. T1 length:width
26. T1 length:first segment height
27. T1 length:T2 length
28. T2 length:width
29. T2 width:mesosoma width
30. Dorsal felt line length:T2 length
31. T2 length anterior to felt line:T2 length posterior to felt line

APPENDIX VI. Coded variables used in final phenetic analysis of *Tricholabiodes*, based on characters and states used in the descriptions; all refer to adult males. The format adopted for character layout is from Brothers & Carpenter (1993).

0. Interocellar area: Same colour as ocellocular area = 0. Darker than ocellocular area = 1.
1. Head, excluding interocellar area: Darker than mesosoma = 0. Same colour as or slightly paler than mesosoma = 1.
2. Legs: Darker than mesosoma = 0. Same colour as or slightly paler than mesosoma = 1.
3. Fore wing: Entirely evenly infuscated = 0. Infuscated posterior to pterostigma = 1. Infuscated posterior to marginal cell = 2.
4. T1: Anterior half same colour as mesosoma, posterior half much darker than mesosoma = 0. Almost entirely of uniform coloration, same colour as mesosoma, except for dark narrow band at apex = 1. Entirely of uniform coloration, same colour as mesosoma = 2.
5. T2: Uniform in coloration, much darker than mesosoma = 0. Anterior two-thirds similar in coloration to mesosoma, posterior one-third with narrow band darker than mesosoma = 1. Uniform in coloration, same colour as mesosoma = 2.
6. T3: Uniform in coloration, same colour as anterior two-thirds of T2 = 0. Anterior half darker than anterior two-thirds of T2, posterior half same colour as anterior two-thirds of T2 = 1. Uniform in coloration, darker than anterior two-thirds of T2 = 2.
7. T5-T6: Much paler than anterior two-thirds of T2 = 0. Same colour as anterior two-thirds of T2 = 1. Darker than anterior two-thirds of T2 = 2.
8. Head with sides behind compound eyes: Subparallel, distinct from weakly convex posterior margin (figs 10c-d) = 0. Slightly convergent posteriorly and gradually merging with weakly convex posterior margin (fig 10b) = 1. Strongly convergent posteriorly and merging with weakly convex posterior margin (fig. 10a) = 2.
9. Frons anterior half (puncture density): Densely punctate, interspaces narrower than puncture diameter = 0. Moderately punctate, interspaces subequal to puncture diameter = 1. Sparsely punctate, interspaces wider than puncture diameter = 2.
10. Frons anterior half (puncture size): With coarse punctation = 0. With medium punctation = 1. With fine punctation = 2.
11. Frons posterior half (puncture density): Sparsely punctate, interspaces wider than puncture diameter = 0. Moderately punctate, interspaces subequal to puncture diameter = 1. Densely punctate, interspaces narrower than puncture diameter = 2.
12. Frons posterior half (puncture size): With medium punctation = 0. With fine punctation = 1.

13. Frons foveola: Absent = 0. Shallow = 1. Deep = 2.
14. Surface between foveola and toruli, with longitudinal groove: Absent = 0. Shallow = 1. Deep = 2.
15. Anterior margin of antennal tubercle: Simple = 0. Ridged = 1.
16. Vertex: Slightly convex with side laterally of lateral ocellus sloping slightly towards compound eye = 0. Strongly convex with side laterally of lateral ocellus sloping strongly towards compound eye = 1.
17. Vertex, posterior to lateral ocellus (puncture density): Densely punctate, interspaces narrower than puncture diameter = 0. Moderately punctate, interspaces subequal to puncture diameter = 1. Sparsely punctate, interspaces wider than puncture diameter = 2.
18. Vertex, posterior to lateral ocellus (puncture size): With coarse punctation = 0. With medium punctation = 1. With fine punctation = 2.
19. Ommatidia of compound eye: Distinct = 0. Indistinct = 1.
20. Ocelli: Small, ocellocular distance at least 1.5 X > width of lateral ocellus = 0. Large, ocellocular distance < width of lateral ocellus = 1.
21. Gena sculpturing (puncture density): Densely punctate, puncture density decreasing posteriorly, interspaces narrower than puncture diameter = 0. Moderately punctate, interspaces subequal to puncture diameter = 1. Sparsely punctate, interspaces wider than puncture diameter = 2.
22. Gena sculpturing (puncture size): With coarse punctation, puncture diameter decreasing posteriorly = 0. With medium punctation = 1. With fine punctation = 2.
23. Free border of clypeus: Strongly protruding, broadly transverse and truncated (fig. 12a) = 0. With mesal area protruding and truncated straight = 1. With mesal area strongly protruding, subsquare and slightly upwardly flexed (fig. 12b) = 2. With mesal area strongly protruding in a slightly upwardly flexed arch (fig. 12c) = 3 . With mesal area strongly protruding in an arch, arch mesally notched forming a triangulate protuberance on each side of midline (fig. 12f) = 4. With mesal area slightly protruding in a weak subrounded arch, arch not upwardly flexed (fig. 12d) = 5. With mesal area slightly protruding in a weak subrounded arch, arch mesally notched forming a weak denticle on each side of midline = 6. Convex (fig. 12e) = 7. Convex with very slight protuberances on either side of midline (fig. 12g) = 8. Convex with a rounded tubercle on either side of midline (fig. 12h) = 9. Convex with a longitudinal elongate tubercle on each side of midline = 10. Convex with a triangulate tubercle on each side of midline, below tubercle declivity bordered laterally by a carina = 11. Flat to slightly posteriorly concave = 12.

24. Central portion of clypeus: Raised and slightly convex = 0. Depressed = 1.
25. Central portion of clypeus (puncture density): Densely punctate, interspaces narrower than puncture diameter = 0. Moderately punctate, interspaces subequal to puncture diameter = 1. Sparsely punctate, interspaces wider than puncture diameter = 2. Impunctate = 3.
26. Central portion of clypeus (puncture size): With medium punctation = 0. With fine punctation = 1. Impunctate = 2.
27. Clypeus with setae: Evenly distributed = 0. Densely clumped on central portion = 1.
28. Mandible: Thicker than high = 0. Higher than thick = 1. Dorso-ventrally dilated = 2.
29. Dorsal rim of mandible: Basal half with weak carina, carina on apical half absent = 0. Entire length with weak carina = 1. Basal half with strong carina, carina on apical half weak = 2.
30. Dorsal rim of mandible: Without an enlarged vertical flange = 0. With an enlarged vertical flange ending at junction between middle and inner tooth, greatest height of flange above ventral tooth, apex of flange subrounded = 1.
31. Middle and inner mandibular teeth: Separate (fig. 11c) = 0. Adjacent (fig. 11b) = 1.
32. Inner mandibular tooth with apex: Truncate (fig. 11d) = 0. Subrounded (fig. 11b) = 1. Acute (fig. 11c) = 2.
33. Mesal margin of mandible: Smooth = 0. Toothed = 1.
34. Ventral margin of mandible: Strongly excised, subtending tooth well developed = 0. Slightly excised, subtending tooth minute = 1.
35. Area on superior basal half of lateral surface of mandible: Simple = 0. With dense ovate pubescent patch present = 1.
36. Area on midlength of lateral surface of mandible: Simple = 0. With strong vertical carina present = 1.
37. Carina on anterior surface of scape: One longitudinal carina = 0. Two longitudinal carinae = 1.
38. First flagellomere: Simple = 0. Basally with a ring of setae = 1.
39. Anterodorsal margin of pronotum: Slightly convex = 0. Strongly convex = 1.
40. Humeral angles of pronotum: Subrounded = 0. Subsquare = 1. Strongly acute = 2.
41. Anterior portion of lateral surface of prothorax: Reticulate = 0. Punctate = 1.
42. Anterolateral epaulet of pronotum: Small, $\leq$ size of reticulation = 0. Large, > size of a reticulation = 1.
43. Area between notauli (puncture density): Densely punctate, interspaces narrower than puncture diameter = 0. Moderately punctate, interspaces subequal to puncture diameter = 1. Sparsely punctate, interspaces wider than puncture diameter = 2.
44. Area between notauli (puncture size): With medium punctation = 0. With fine punctation = 1.

45. Area lateral of notauli (puncture density): Moderately punctate, interspaces subequal to puncture diameter = 0. Sparsely punctate, interspaces wider than puncture diameter = 1.
46. Area lateral of notauli (puncture size): With medium punctation = 0. With fine punctation = 1.
47. Posterolateral area of mesoscutum: With coarse punctation = 0. With medium punctation = 1.
48. Posterolateral corner of mesoscutum: Raised as an angulate tooth = 0. Flat = 1.
49. Scutellum: Subsquare = 0. Subtrapezoidal, posteriorly convergent = 1.
50. Scutellum (puncture density): Densely punctate, interspaces narrower than puncture diameter (or modified differently from States 1 or 2) = 0. Moderately punctate, interspaces subequal to puncture diameter = 1. Sparsely punctate, interspaces wider than puncture diameter = 2.
51. Scutellum (puncture size): Reticulate = 0. With coarse punctation = 1. With medium punctation = 2. With fine punctation = 3.
52. Dorsellum laterally: Simple = 0. Ridged = 1.
53. Areola: Longer than neighbouring areae = 0. Same length as neighbouring areae = 1. Shorter than neighbouring areae = 2.
54. Mesepisternum anterior half anterior to mesepisternal scrobe (puncture density): Densely punctate, interspaces narrower than puncture diameter = 0. Moderately punctate, interspaces subequal to puncture diameter = 1. Sparsely punctate, interspaces narrower than puncture diameter = 2.
55. Mesepisternum anterior half anterior to mesepisternal scrobe (puncture size): Roughly striated = 0. Reticulate = 1. With coarse punctation = 2. With medium punctation = 3. With fine punctation = 4.
56. Mesepisternum posterior half anterior to mesepisternal scrobe (puncture size): Reticulate = 0. Coarsely punctate = 1.
57. Posterior to mesepisternal scrobe: Reticulate = 0. Coarsely punctate = 1. Coarsely punctate with punctures decreasing in size posteriorly = 2.
58. Mesepisternal scrobe: Small or absent = 0. Large = 1.
59. Mesepisternal groove: Absent = 0. Present = 1.
60. Anterior concavity of mesoscutum: Impunctate = 0. Transversely ridged = 1.
61. Mesosternum, posterior to anterior concavity (puncture density): Smooth = 0. Sparsely punctate, interspaces wider than puncture diameter = 1. Moderately punctate, interspaces subequal to puncture diameter = 2. Densely punctate, interspaces narrower than puncture diameter = 3.
62. Mesosternum, posterior to anterior concavity (puncture size): Smooth = 0. With fine punctation = 1. With medium punctation = 2.

63. Anteromesal surface of mesosternum: Simple = 0. Each side of midline with a pair of conical protuberances = 1.
64. Anteromesal surface of mesosternum: Simple = 0. Swollen with transverse ridges = 1.
65. Second submarginal cell: Anteriorly sessile (fig. 13a) = 0. Anteriorly acute and barely reaching marginal cell (not petiolate) (fig. 13b) = 1. Anteriorly petiolate (fig. 13c) = 2.
66. Outer lateral margin of ventral surface of mesocoxa: Unarmed = 0. Weakly carinate = 1.
67. Mesal margin of mesocoxa: Without a triangular protuberance = 0. With short triangular protuberance approximately 0.25 X length of coxa = 1.
68. Mesal margin of mesocoxa: Without a longitudinal carina = 0. With longitudinal carina 0.5 X length of coxa = 1.
69. Mesofemur: Slender, with greatest width at midlength (fig. 15a) = 0. Slender, with greatest width in basal third, dorsal and ventral margin subparallel (fig. 15b) = 1. Robust, with greatest width in basal third, dorsal and ventral margin subparallel = 2.
70. Anteriorly on basal half of mesofemur: Simple = 0. Shallowly concave = 1.
71. Posteriorly on basal half of mesofemur: Simple = 0. With slight elongate protuberance = 1.
72. Posteriorly at midlength of mesofemur: Convex = 0. Slightly flattened to shallowly concave = 1. Moderately to strongly concave = 2.
73. Distal half of mesotibia: Simple, in cross-section oval = 0. Laterally enlarged, in cross-section ellipsoidal = 1.
74. Distal half of mesotibia: Simple, in cross-section oval = 0. Anterior and posterior surface shallowly flattened, ventral margin with weak carina, in cross-section mid tibia subtriangular = 1.
75. Macrosetae of mesotibia: Shorter than shorter spur = 0. Longer than shorter spur = 1.
76. Longer mesotibial spur: Straight = 0. Slightly arched towards the midline, bow-like = 1. Subsigmoidal = 2.
77. Mesobasitarsus: Straight = 0. Curved ventrally = 1.
78. Mesobasitarsus: Straight = 0. Curved anteriorly = 1.
79. Anterior and posterior surfaces of mesobasitarsus: Convex = 0. Slightly concave = 1.
80. Mesal margin of metacoxa: Ventrally enlarged and strongly carinate, in cross-section subtriangulate = 0. With enlarged, slightly rounded lobule, apex of lobule weakly sclerotised (fig. 16i) = 1. With large dentiform flange posteriorly (fig. 16e) = 2. With large protruding flange at midlength (fig. 16d) = 3. With triangular protuberance > 0.5 X length of coxa, protuberance continuous with contour of ventral surface of coxa (fig. 16c) = 4. With triangular protuberance < 0.40 X length of coxa, protuberance continuous with

contour of ventral surface of coxa (fig. 16b) = 5. With triangular protuberance < 30 X length of coxa, protuberance separate from contour of ventral surface of coxa = 6. With arched, slightly sclerotised ridge < 0.30 X length of coxa = 7. Simple (fig. 16a) = 8. With longitudinal carina < 0.5 X length of coxa (fig. 16f) = 9. With longitudinal carina < 0.5 X length of coxa, carina posteriorly slightly angulated (fig. 16g) = 10. With longitudinal carina > 0.6 X length of coxa (fig. 16h) = 11. With a rounded protuberance, apical margin slightly sclerotised and upturned, > 0.6 X length of coxa = 12.

81. Posteromedial margin of metacoxa: Simple = 0. With tuft of setae = 1.
82. Metatrochanter: Simple = 0. Slightly swollen ventrally = 1.
83. Metafemur with macrosetae: Shorter than shorter spur = 0. Longer than shorter tibial spur = 1. Longer than longer tibial spur = 2.
84. Metafemur with macrosetae: All subequal in length = 0. Increasing in length distally = 1.
85. Ventral surface of metafemur: With macrosetae evenly distributed = 0. With macrosetae densely clumped = 1.
86. Metatibial macrosetae: In subequal amounts = 0. On posterior surface twice as dense as setae on anterior surface = 1.
87. Metatibial macrosetae: Shorter than shorter spur = 0. Longer than shorter spur, shorter than longer spur = 1. Longer than longer spur = 2.
88. Longer metatibial spur: Straight = 0. Subsigmoidal = 1.
89. Metabasitarsus: Straight = 0. Curved anteriorly = 1.
90. Metabasitarsus with macrosetae: Absent = 0. Only on posterior surface and shorter than those on tibia = 1. Only on posterior surface and length subequal to those on tibia = 2.
91. T1 (puncture density): Densely punctate, interspaces narrower than puncture diameter = 0. Moderately punctate, interspaces subequal to puncture diameter = 1. Sparsely punctate, interspaces narrower than puncture diameter = 2.
92. T1 (puncture size): Reticulate = 0. With coarse punctation = 1. With medium punctation = 2. With fine punctation = 3.
93. Anterior one-third of T2 (puncture density): Densely punctate, interspaces narrower than puncture diameter = 0. Moderately punctate, interspaces subequal to puncture diameter = 1. Sparsely punctate, interspaces wider than puncture diameter = 2.
94. Anterior one-third of T2 (puncture size): Costulate = 0. Reticulate = 1. With coarse punctation = 2. With medium punctation = 3. With fine punctation = 4.
95. Posterior two-thirds of T2 (puncture density): Densely punctate, interspaces narrower than puncture diameter = 0. Moderately punctate, interspaces subequal to puncture diameter = 1.

Sparsely punctate, interspaces narrower than puncture diameter = 2.

96. Posterior two-thirds of T2 (puncture size): Costulate, becoming punctate posteriorly = 0. Reticulated, becoming punctate posteriorly = 1. With medium punctation (or modified differently from State 1) = 2. With fine punctation = 3.
97. Mesally on S2: Convex = 0. Concave = 1.
98. S2 with setae: Evenly distributed = 0. More dense centrally than laterally = 1.
99. S2 with mesal setae: Shorter than shorter mesotibial spur = 0. Longer than shorter mesotibial spur = 1.
100. Felt lines on S2: Absent = 0. Present = 1.
101. S2 anterior mesal area: Unarmed = 0. With slight protuberance < 0.15 X length of sternum = 1. With longitudinal carina > 0.20 X length of sternum = 2. With strong carina > 0.50 X length of sternum = 3.
102. Anterior half of S2 (puncture density): Densely punctate, interspaces narrower than puncture diameter = 0. Moderately punctate, interspaces subequal to puncture diameter = 1. Sparsely punctate, interspaces wider than puncture diameter = 2.
103. Anterior half of S2 (puncture size): With coarse punctation = 0. With medium punctation = 1. With fine punctation = 2.
104. Posterior half of S2 (puncture density): Densely punctate, interspaces narrower than puncture diameter = 0. Moderately punctate, interspaces subequal to puncture diameter = 1. Sparsely punctate, interspaces wider than puncture diameter = 2.
105. Posterior half of S2 (puncture size): With medium punctation = 0. With fine punctation = 1.
106. Posterolateral area of S2: Simple = 0. With diagonal transverse tubercles = 1.
107. Setae on posterior margin of S2: Uniformly arranged = 0. Increasing in density towards the midline = 1.
108. S4-S6: With setae decumbent = 0. With subequal amounts of decumbent and erect setae = 1. With setae clumped and erect = 2.
109. Anterior one-third of pygidium: Sparsely punctate, interspaces wider than puncture diameter = 0. Moderately punctate, interspaces subequal to puncture diameter = 1. Densely punctate, interspaces narrower than puncture diameter = 2. Reticulate = 3.
110. Pygidial plate (puncture size): Impunctate except lateral and posterior margin finely punctured = 0. Impunctate = 1. Anteriorly impunctate, posteriorly finely punctate = 2. Entirely finely punctate, except anterolateral margins impunctate = 3. Entirely finely punctate = 4. Entirely with diagonal punctostriatus = 5.

111. Posterior margin of hypopygium: Entire (fig. 17a) = 0. Shallowly concave (fig. 17b) = 1. Shallowly notched = 2. Deeply notched (fig. 17c) = 3.
112. Mesal area of hypopygium: Simple = 0. With longitudinal depression = 1.
113. Volsellae shape: Oval = 0. Conical and straight = 1. Conical and slightly mesally curved = 2.
114. Ventral surface of volsellae: With a cavity, opening of cavity more lateral than ventral = 0. With a cavity, opening of cavity more ventral than lateral = 1. With cavity absent = 2.
115. Mesal margin of volsella: Simple = 0. With a slightly rounded protuberance at midlength = 1.
116. Parapenial lobe: > 1/4 length of penis valve, thin and slightly curved towards the midline = 0. > 1/4 length of penis valve, broad and straight = 1. < 1/4 length of penis valve = 2. Absent = 3.
117. Penis valve with apex of ventral margin bearing: One tooth = 0. Two teeth = 1. Three teeth = 2.
118. Apical tooth of penis valve: Long = 0. Short = 1.
119. Ventral margin of penis valve, at midlength: With a rounded lobe = 0. Smooth = 1.
120. Penis valve with dorsal lobe: Posteriorly produced = 0. Slightly reduced and rounded, not posteriorly produced = 1. Much reduced or lost = 2.
121. Mesal margin of paramere, at midlength: Unarmed = 0. With lobe rounded = 1. With lobe subsquare = 2.
122. Paramere (d.v.): Narrow = 0. Broad = 1.
123. Sides of paramere (d.v.): Tapering towards the apex = 0. Subparallel, except apical 1/4 might be tapering towards the apex = 1. Diverging towards the apex = 2.
124. Apical 1/3 of paramere (d.v.): Recurved = 0. Straight, linear with basal 2/3 of paramere = 1.

APPENDIX VII. Data matrix for phenetic analysis of 447 specimens comprising 52 species of *Tricholabiodes* using the ratios as in Appendix V. For the following species: *T. palaestinensis*, *T. scorteccii*, *T. signatipennis*, *T. stigmaticus* and *T. trochantalis*, not all the measured specimens included in the final description were used in the phenetic analysis since they were only received after completion of this analysis. The first variable is 0 and the last is 31.

acer (holotype)

1.53	0.99	1.53	1.47	0.64	1.31	0.92	1.15	0.45	0.78	2.68	1.69	1.02
1.60	0.89	0.79	0.86	0.82	2.37	1.51	0.30	0.67	0.63	0.74	1.46	2.23
2.58	1.20	0.85	0.97	0.52	0.66							

acer (paratype)[1]

1.50	0.94	1.50	1.47	0.61	1.29	0.93	1.40	0.33	0.89	1.95	1.72	1.07
1.68	0.87	0.80	0.91	0.85	2.34	1.78	0.26	0.77	0.72	0.61	1.31	1.93
2.38	1.10	0.81	1.05	0.47	0.81							

acer (paratype)[2]

1.53	0.95	1.43	1.54	0.63	1.31	0.95	1.29	0.44	0.79	2.00	1.70	1.06
1.67	0.89	0.80	0.90	0.85	2.15	1.60	0.29	0.76	0.63	0.70	1.40	2.01
2.40	1.25	0.87	1.00	0.50	0.70							

acer (paratype)[3]

1.55	0.94	1.55	1.49	0.62	1.30	0.88	1.29	0.40	0.88	2.86	2.00	1.17
1.67	0.87	0.80	0.91	0.87	2.58	1.67	0.31	0.73	0.66	0.72	1.32	2.21
2.53	1.28	0.84	0.96	0.58	0.79							

acer (paratype)[4]

1.48	0.98	1.42	1.59	0.65	1.46	0.95	1.10	0.35	0.81	2.71	1.86	0.96
1.67	0.87	0.78	0.88	1.01	2.47	1.68	0.29	0.73	0.63	0.70	1.37	1.89
2.17	0.91	0.94	0.98	0.45	0.70							

acer (paratype)[5]

1.52	0.96	1.55	1.54	0.77	1.25	1.05	1.01	0.42	0.83	2.93	1.67	1.12
1.63	0.88	0.82	0.86	0.87	2.13	1.52	0.30	0.76	0.61	0.79	1.38	1.72
2.13	0.89	0.95	0.96	0.46	0.78							

alveolus (holotype)

1.44	0.96	1.48	1.50	0.63	1.14	1.10	0.82	0.40	0.91	1.77	1.27	1.00
1.75	0.87	0.77	0.87	0.68	3.06	1.29	0.42	0.76	0.69	0.76	1.52	2.29

2.24	0.96	1.00	0.96	0.53	0.85							
andrei (holotype)												
1.37	0.82	1.37	1.87	0.56	1.22	0.84	1.28	0.37	0.93	1.38	1.25	1.03
1.63	0.88	0.78	0.91	0.98	3.27	1.51	0.38	0.74	0.65	0.81	1.15	2.76
2.91	1.18	0.90	0.94	0.55	0.96							
andrei (paratype)[1]												
1.41	0.82	1.45	1.79	0.68	1.18	0.93	1.05	0.41	0.98	1.56	1.30	1.00
1.75	0.90	0.80	0.91	0.67	3.00	1.40	0.40	0.71	0.66	0.74	1.20	2.35
2.40	1.00	0.98	0.99	0.60	1.06							
andrei[1]												
1.34	0.87	1.38	1.78	0.69	1.25	0.97	1.09	0.43	1.00	1.68	1.36	1.02
1.74	0.90	0.76	0.94	0.78	2.82	1.39	0.43	0.65	0.65	0.69	1.28	2.33
2.36	1.00	0.93	1.01	0.63	1.04							
andrei[2]												
1.40	0.86	1.45	1.80	0.68	1.17	0.98	1.09	0.42	0.96	1.54	1.28	1.03
1.69	0.88	0.76	0.92	0.70	3.20	1.53	0.37	0.73	0.65	0.80	1.06	2.40
2.35	0.96	1.02	0.97	0.53	1.14							
andrei[3]												
1.45	0.82	1.47	1.82	0.67	1.10	0.96	1.24	0.44	1.04	1.61	1.26	0.97
1.70	0.88	0.84	0.88	0.63	3.27	1.26	0.52	0.68	0.63	0.77	1.12	2.21
2.47	1.09	0.88	0.99	0.64	0.88							
andrei[4]												
1.39	0.82	1.42	1.82	0.60	1.28	0.84	0.90	0.37	1.06	1.38	1.26	1.02
1.69	0.90	0.73	0.91	0.66	3.59	1.37	0.45	0.70	0.67	0.77	1.23	2.20
2.41	1.00	0.93	1.00	0.67	1.14							
andrei[5]												
1.49	0.88	1.47	1.60	0.62	1.32	0.88	1.11	0.40	1.08	1.53	1.36	1.03
1.70	0.90	0.78	0.90	0.73	3.77	1.54	0.41	0.72	0.67	0.79	1.28	2.43
2.65	0.96	1.01	1.03	0.61	1.15							
andrei[6]												
1.41	0.83	1.40	1.77	0.56	1.18	0.95	0.92	0.38	1.06	1.49	1.30	1.03
1.67	0.87	0.75	0.92	0.64	2.96	1.49	0.45	0.70	0.68	0.73	1.20	2.35
2.22	1.04	1.00	0.96	0.48	1.08							

andrei[7]

1.35	0.82	1.40	1.83	0.69	1.25	0.92	1.05	0.38	0.90	1.53	1.27	1.04
1.67	0.87	0.75	0.94	0.66	3.06	1.43	0.46	0.74	0.68	0.66	1.13	2.48
2.40	1.05	0.95	0.97	0.57	1.04							

arabicus (holotype)

1.45	0.95	1.55	1.40	0.65	1.30	0.78	1.15	0.40	0.90	1.75	1.20	0.90
1.60	0.91	0.80	0.85	0.40	3.20	1.40	0.50	0.70	0.70	0.73	1.10	2.00
2.50	1.00	0.96	1.05	0.45	1.20							

arabicus (paratype)[1]

1.47	0.98	1.51	1.48	0.62	1.36	0.82	1.33	0.41	0.78	1.84	1.36	1.00
1.66	0.91	0.80	0.84	0.57	3.99	1.51	0.51	0.73	0.69	0.75	1.18	2.83
2.56	1.19	0.93	1.00	0.45	1.95							

arabicus (paratype)[2]

1.47	0.99	1.55	1.45	0.67	1.20	0.83	1.53	0.41	0.79	1.93	1.32	0.98
1.77	0.93	0.78	0.86	0.52	3.95	1.47	0.52	0.77	0.73	0.69	0.98	2.82
2.85	1.17	0.90	1.09	0.48	1.30							

arabicus[1]

1.46	1.51	1.55	1.43	0.66	1.38	0.93	1.34	0.40	0.85	1.96	1.44	1.05
1.81	9.60	0.82	0.86	0.54	3.71	1.47	0.45	0.74	0.72	0.82	1.32	2.31
2.55	1.08	0.91	1.07	0.53	1.74							

arabicus[2]

1.47	1.05	1.55	1.43	0.70	1.34	0.71	1.50	0.39	0.88	1.77	1.15	0.97
1.63	0.93	0.76	0.82	0.42	4.13	1.25	0.62	0.77	0.69	0.80	1.11	2.57
2.78	0.95	0.98	1.06	0.53	1.38							

arabicus[3]

1.49	1.03	1.53	1.32	0.59	1.23	0.76	1.52	0.38	0.85	2.30	1.50	1.00
1.62	0.92	0.76	0.85	0.51	3.64	1.31	0.47	0.81	0.77	0.79	1.37	2.12
2.56	0.94	1.02	1.03	0.42	1.30							

arabicus[4]

1.45	1.00	1.57	1.38	0.72	1.44	0.77	1.52	0.39	0.81	1.90	1.40	1.04
1.70	0.92	0.78	0.84	0.46	3.97	1.39	0.49	0.75	0.72	0.82	1.14	2.35
2.65	1.04	0.99	1.04	0.51	1.46							

arabicus[5]

1.40	0.94	1.58	1.38	0.73	1.46	0.80	1.40	0.39	0.92	1.83	1.35	1.04
1.63	0.90	0.78	0.86	0.45	3.88	1.38	0.58	0.76	0.69	0.81	1.14	2.17
2.52	1.00	0.98	1.03	0.52	1.37							

arabicus[6]

1.44	1.04	1.62	1.38	0.71	1.50	0.77	1.31	0.39	0.81	1.97	1.26	0.98
1.68	0.92	0.82	0.86	0.42	3.77	1.41	0.54	0.74	0.70	0.82	1.12	2.17
2.68	1.07	0.90	1.10	0.54	1.60							

arabicus[7]

1.43	1.03	1.57	1.34	0.67	1.35	0.76	1.51	0.40	0.84	2.32	1.49	1.05
1.73	0.89	0.84	0.81	0.40	3.82	1.57	0.45	0.77	0.71	0.79	1.26	2.10
2.46	0.98	0.96	1.08	0.53	1.76							

arabicus[8]

1.44	1.00	1.51	1.38	0.66	1.38	0.95	1.25	0.39	0.87	1.97	1.45	1.05
1.65	0.92	0.85	0.81	0.38	4.45	1.49	0.45	0.70	0.70	0.76	1.29	2.57
2.77	1.00	1.04	1.03	0.47	1.48							

arabicus[9]

1.36	0.97	1.54	1.47	0.80	1.28	0.80	1.19	0.38	0.80	1.90	1.35	1.04
1.70	0.93	0.80	0.79	0.64	4.48	1.47	0.45	0.79	0.74	0.75	1.36	2.39
2.76	1.15	0.87	1.06	0.50	1.74							

arabicus[10]

1.44	0.97	1.63	1.35	0.75	1.41	0.83	1.46	0.37	0.88	2.11	1.40	1.00
1.57	0.94	0.77	0.87	0.46	3.15	1.35	0.52	0.70	0.70	0.71	1.11	1.96
2.73	0.93	0.93	1.04	0.53	1.28							

arabicus[11]

1.49	0.97	1.60	1.34	0.79	1.26	0.93	1.13	0.41	0.84	1.88	1.42	1.06
1.65	0.92	0.81	0.84	0.51	3.99	1.32	0.49	0.77	0.69	0.75	1.32	2.49
2.95	0.99	1.03	1.05	0.45	1.28							

arabicus[12]

1.42	0.93	1.55	1.36	0.74	1.38	0.69	1.52	0.35	0.82	1.92	1.25	1.00
1.56	0.96	0.72	0.79	0.52	4.00	1.55	0.51	0.72	0.74	0.70	1.25	2.25
2.69	1.08	0.87	1.03	0.43	1.25							

arabicus[13]

1.41	0.90	1.48	1.41	0.70	1.45	0.83	1.54	0.40	0.94	1.99	1.29	1.18

1.54	0.94	0.78	0.83	0.65	3.47	1.28	0.55	0.66	0.70	0.80	1.32	1.91
2.47	1.07	0.79	1.02	0.59	1.13							
arabicus[14]												
1.45	1.05	1.52	1.38	0.72	1.37	0.86	1.19	0.42	0.81	2.31	1.17	0.85
1.68	0.94	0.79	0.80	0.39	3.89	1.52	0.41	0.79	0.82	0.83	1.39	2.20
2.61	0.93	1.02	1.07	0.45	1.70							
arabicus[15]												
1.43	0.99	1.47	1.44	0.70	1.52	0.79	1.22	0.39	0.88	1.76	1.36	0.99
1.71	0.88	0.80	0.90	0.46	4.07	1.39	0.55	0.71	0.74	0.80	1.26	2.38
2.58	1.11	0.92	1.03	0.48	1.44							
arabicus[16]												
1.47	0.93	1.58	1.34	0.68	1.30	0.82	1.46	0.37	0.90	1.72	1.35	1.06
1.63	0.92	0.80	0.84	0.50	3.50	1.22	0.47	0.63	0.65	0.80	1.04	2.19
2.74	1.02	0.94	1.00	0.52	1.30							
arabicus[17]												
1.40	0.95	1.47	1.40	0.73	1.36	0.78	1.33	0.41	0.87	1.90	1.40	1.00
1.80	0.95	0.80	0.84	0.44	3.72	1.40	0.51	0.71	0.69	0.80	1.07	2.01
2.50	1.17	0.96	1.05	0.53	1.35							
arabicus[18]												
1.38	1.43	1.51	1.43	0.67	1.20	0.71	1.52	0.39	0.81	2.00	1.44	0.99
1.75	0.91	0.83	0.82	0.46	4.00	1.38	0.45	0.70	0.73	0.69	1.15	2.35
2.68	1.06	0.98	1.08	0.45	1.59							
arabicus[19]												
1.41	1.00	1.62	1.38	0.74	1.28	0.80	1.40	0.35	0.90	1.80	1.30	1.15
1.70	0.91	0.78	0.81	0.44	3.89	1.38	0.48	0.68	0.72	0.73	1.24	1.98
2.95	0.96	1.01	1.03	0.51	1.68							
arabicus[20]												
1.39	0.99	1.53	1.41	0.65	1.52	0.83	1.46	0.39	0.84	1.96	1.35	1.10
1.56	0.94	0.76	0.84	0.39	3.67	1.53	0.45	0.66	0.72	0.78	1.15	2.05
2.61	1.14	0.98	1.07	0.47	1.35							
arabicus[21]												
1.43	1.24	1.55	1.44	0.72	1.45	0.69	1.50	0.39	0.83	2.15	1.45	1.09
1.60	0.90	0.78	0.89	0.58	4.00	1.44	0.50	0.68	0.65	0.74	1.22	1.97
2.74	1.13	0.90	1.05	0.57	1.40							

asiaticus (paralectotype)

1.47	0.97	1.60	1.35	0.75	1.32	0.90	1.35	0.37	0.89	2.08	1.32	1.02
1.61	0.90	0.83	0.79	0.38	3.80	1.39	0.48	0.76	0.67	0.76	1.20	2.34
2.99	1.01	1.00	1.01	0.53	1.06							

asiaticus[1]

1.47	1.01	1.55	1.39	0.72	1.33	0.87	1.23	0.42	0.86	2.34	1.38	1.00
1.61	0.95	0.82	0.78	0.40	4.55	1.53	0.53	0.76	0.77	0.70	1.35	2.37
2.82	1.00	1.03	0.99	0.51	1.54							

asiaticus[2]

1.55	1.01	1.59	1.31	0.70	1.30	0.85	1.58	0.39	0.81	2.35	1.43	1.06
1.67	0.93	0.80	0.83	0.41	4.09	1.45	0.49	0.76	0.73	0.76	1.19	2.25
2.69	0.98	1.01	1.06	0.52	1.56							

asiaticus[3]

1.43	1.04	1.59	1.41	0.67	1.48	0.98	1.38	0.36	0.83	2.17	1.32	1.03
1.64	0.90	0.86	0.82	0.39	3.89	1.40	0.51	0.70	0.65	0.80	1.21	2.25
2.68	0.95	1.01	1.02	0.51	1.09							

asiaticus[4]

1.49	0.99	1.55	1.36	0.69	1.40	0.93	1.32	0.37	0.92	2.23	1.38	0.98
1.62	0.87	0.85	0.85	0.42	4.33	1.33	0.60	0.81	0.75	0.76	1.15	2.22
2.67	0.90	0.98	1.03	0.55	1.84							

asiaticus[5]

1.50	0.97	1.55	1.35	0.71	1.29	1.00	1.25	0.37	0.80	2.19	1.42	1.04
1.67	0.93	0.83	0.80	0.38	4.17	1.72	0.48	0.83	0.75	0.74	1.02	2.26
2.89	0.99	0.98	1.03	0.47	1.46							

asiaticus[6]

1.54	0.98	1.54	1.24	0.65	1.36	0.91	1.28	0.39	0.98	2.23	1.35	1.00
1.60	0.93	0.79	0.89	0.44	4.28	1.44	0.53	0.76	0.78	0.72	1.23	2.22
2.55	0.94	1.00	1.02	0.51	1.38							

asiaticus[7]

1.37	0.95	1.61	1.47	0.79	1.28	0.97	1.05	0.36	0.88	2.01	1.36	1.04
1.57	0.92	0.87	0.76	0.41	4.08	1.52	0.49	0.80	0.76	0.71	1.22	2.07
2.71	1.00	0.92	1.04	0.49	1.45							

asiaticus[8]

1.43	0.91	1.51	1.42	0.69	1.39	0.86	1.33	0.37	0.83	2.13	1.35	1.02

1.61	0.90	0.84	0.83	0.35	4.25	1.44	0.52	0.84	0.78	0.68	1.31	2.31
2.85	1.07	0.91	1.02	0.47	1.72							
asiaticus[9]												
1.49	1.03	1.58	1.35	0.72	1.37	0.90	1.33	0.37	0.87	2.20	1.48	1.06
1.62	0.90	0.86	0.81	0.32	4.10	1.53	0.45	0.77	0.75	0.76	1.10	2.17
2.64	0.98	0.95	1.02	0.52	1.21							
asiaticus[10]												
1.45	0.95	1.59	1.37	0.71	1.44	0.91	1.41	0.38	0.89	2.16	1.29	1.03
1.60	0.90	0.85	0.83	0.39	4.05	1.49	0.49	0.79	0.84	0.65	1.14	2.31
2.85	1.01	0.96	1.02	0.48	2.00							
asiaticus[11]												
1.46	0.99	1.58	1.38	0.74	1.38	0.83	1.30	0.37	0.82	2.12	1.40	1.03
1.62	0.90	0.84	0.82	0.38	4.29	1.30	0.53	0.84	0.75	0.79	1.09	2.23
2.85	1.02	0.96	1.03	0.48	1.38							
asiaticus[12]												
1.43	0.96	1.58	1.38	0.74	1.39	0.82	1.29	0.41	0.93	2.15	1.40	1.04
1.56	0.89	0.80	0.86	0.32	4.29	1.33	0.49	0.72	0.77	0.70	1.25	2.14
2.64	0.99	0.92	1.06	0.49	1.77							
asiaticus[13]												
1.42	0.94	1.56	1.44	0.72	1.32	0.88	1.20	0.38	0.88	2.25	1.45	1.04
1.53	0.86	0.86	0.83	0.37	3.65	1.42	0.49	0.89	0.74	0.78	1.37	2.22
2.78	1.03	0.92	1.01	0.61	1.07							
asiaticus[14]												
1.48	0.99	1.58	1.38	0.71	1.42	0.85	1.28	0.37	0.86	2.15	1.42	1.01
1.61	0.90	0.87	0.82	0.49	4.12	1.58	0.46	0.68	0.74	0.75	1.17	2.16
2.74	0.88	1.05	1.01	0.51	1.18							
asiaticus[15]												
1.49	1.02	1.55	1.34	0.70	1.45	0.86	1.19	0.35	0.87	2.28	1.44	1.03
1.64	0.88	0.79	0.90	0.31	3.97	1.45	0.53	0.79	0.78	0.74	1.03	2.29
2.91	0.98	1.01	1.02	0.46	1.60							
asiaticus[16]												
1.45	0.99	1.64	1.38	0.76	1.31	0.86	1.24	0.35	0.87	2.23	1.38	1.02
1.64	0.87	0.84	0.85	0.33	4.31	1.39	0.50	0.79	0.75	0.76	1.20	2.18
2.69	1.00	0.94	1.04	0.49	1.68							

asiaticus[17]

1.41	0.99	1.54	1.42	0.74	1.35	0.87	1.34	0.34	0.86	2.24	1.48	1.07
1.53	0.90	0.79	0.85	0.43	3.78	1.51	0.47	0.76	0.80	0.73	1.07	1.93
2.84	1.00	0.88	1.08	0.50	1.36							

bactrianus

1.58	0.94	1.53	1.33	0.59	1.38	0.89	1.78	0.33	0.87	2.23	1.54	1.08
1.59	0.89	0.86	0.85	0.47	3.45	1.55	0.45	0.81	0.72	0.67	1.17	2.40
2.83	0.95	0.98	0.99	0.40	1.15							

beludzhistanus (holotype)

1.55	1.01	1.59	1.26	0.61	1.36	0.85	1.34	0.21	0.91	2.30	1.53	1.07
1.58	0.89	0.83	0.85	0.38	3.87	1.39	0.54	0.79	0.69	0.72	1.22	2.31
2.78	1.00	0.97	0.99	0.59	1.00							

brothersi (holotype)

1.55	0.90	1.61	1.34	0.73	1.31	0.87	0.67	0.34	0.81	1.88	1.24	1.00
1.55	0.90	0.83	0.85	0.52	4.72	1.65	0.47	0.79	0.72	0.67	1.23	2.28
2.75	0.91	1.03	1.00	0.34	0.94							

brothersi (paratype)[1]

1.57	0.92	1.59	1.37	0.68	1.50	0.93	1.56	0.31	0.93	2.19	1.36	1.11
1.55	0.88	0.87	0.83	0.52	3.87	1.61	0.45	0.82	0.75	0.66	1.35	2.09
2.80	0.86	1.02	0.99	0.29	0.88							

brothersi (paratype)[2]

1.59	0.89	1.58	1.31	0.68	1.34	0.93	1.20	0.38	0.84	2.11	1.39	1.10
1.53	0.87	0.84	0.84	0.45	3.89	1.77	0.40	0.82	0.77	0.69	1.22	2.20
2.52	0.90	1.02	0.98	0.32	0.90							

brothersi (paratype)[3]

1.55	0.93	1.66	1.32	0.67	1.40	0.86	1.25	0.39	0.87	2.00	1.34	1.01
1.60	0.90	0.87	0.81	0.46	4.27	1.68	0.46	0.90	0.82	0.63	1.30	2.31
2.60	0.91	1.05	1.05	0.28	1.02							

carinifer (reference specimen)

1.50	0.93	1.60	1.44	0.72	1.26	0.84	1.31	0.42	0.94	1.90	1.38	1.07

1.73	0.88	0.84	0.88	0.62	4.21	1.49	0.50	0.83	0.71	0.64	1.34	2.61
3.05	1.14	0.97	1.02	0.56	1.16							
carinifer[1]												
1.45	0.96	1.56	1.49	0.69	1.32	0.85	1.35	0.41	0.79	1.80	1.28	1.05
1.72	0.93	0.76	0.87	0.67	4.16	1.70	0.48	0.76	0.63	0.71	1.59	2.88
3.36	1.12	1.07	0.97	0.47	0.98							
carinifer[2]												
1.44	0.93	1.56	1.54	0.73	1.21	0.90	1.32	0.44	0.86	2.05	1.38	1.02
1.69	0.93	0.79	0.83	0.70	4.26	1.45	0.49	0.77	0.73	0.68	1.51	2.54
3.05	1.06	1.00	1.02	0.54	1.07							
carinifer[3]												
1.47	0.91	1.54	1.50	0.70	1.31	0.80	1.29	0.42	1.00	1.84	1.27	1.08
1.66	0.88	0.83	0.87	0.58	4.39	1.44	0.55	0.90	0.81	0.56	1.50	2.58
2.93	1.16	0.93	0.99	0.63	0.99							
carinifer[4]												
1.51	0.90	1.56	1.45	0.64	1.31	0.90	1.21	0.44	0.91	1.89	1.28	1.00
1.63	0.89	0.77	0.86	0.57	3.84	1.73	0.40	0.79	0.65	0.64	1.42	2.32
3.06	1.13	0.90	1.04	0.57	1.03							
carinifer[5]												
1.48	0.93	1.68	1.45	0.72	1.11	0.88	1.16	0.47	0.96	1.72	1.38	1.03
1.72	0.87	0.80	0.89	0.68	4.73	1.49	0.49	0.83	0.68	0.65	1.47	2.63
3.01	1.13	1.00	1.00	0.60	1.16							
carinifer[6]												
1.44	0.95	1.60	1.50	0.75	1.33	0.90	1.37	0.45	1.09	1.74	1.24	0.94
1.64	0.85	0.77	0.90	0.61	3.55	1.61	0.48	0.76	0.68	0.67	1.25	2.66
3.09	1.12	1.03	0.99	0.53	0.70							
carinifer[7]												
1.51	0.94	1.57	1.42	0.68	1.27	0.89	1.26	0.43	0.82	1.70	1.32	1.09
1.74	0.89	0.73	0.94	0.59	4.13	1.83	0.40	0.85	0.82	0.53	1.42	2.46
2.89	1.15	0.95	1.05	0.54	1.38							
carinifer[8]												
1.49	1.03	1.62	1.40	0.73	1.28	0.91	1.22	0.42	0.96	1.58	1.25	1.05
1.77	0.90	0.74	0.90	0.66	3.89	1.45	0.52	0.75	0.76	0.68	1.55	2.52
2.81	1.10	1.00	1.04	0.49	1.08							

carinifer[9]

1.51	0.92	1.53	1.48	0.70	1.38	0.79	1.81	0.43	0.90	1.91	1.35	0.99
1.68	0.89	0.78	0.85	0.60	4.06	1.44	0.50	0.79	0.62	0.69	1.44	2.44
2.92	1.15	0.95	0.98	0.59	1.02							

carinifer[10]

1.46	0.93	1.61	1.53	0.76	1.27	0.82	1.33	0.47	0.99	1.61	1.37	1.09
1.69	0.91	0.81	0.86	0.56	3.91	1.43	0.51	0.84	0.77	0.58	1.43	2.47
2.93	1.08	1.01	1.01	0.49	1.00							

carinifer[11]

1.65	0.95	1.67	1.46	0.82	1.20	0.89	1.42	0.42	1.00	1.54	1.43	1.12
1.75	0.82	0.84	0.92	0.54	4.16	1.71	0.43	0.78	0.75	0.62	1.48	2.10
2.55	0.88	1.03	1.05	0.54	1.09							

carinifer[12]

1.44	0.91	1.49	1.49	0.81	1.24	0.99	1.39	0.46	1.00	1.53	1.00	0.91
1.75	0.80	0.83	0.94	0.67	4.23	1.69	0.58	0.73	0.69	0.68	1.17	2.00
2.52	0.90	1.01	1.05	0.59	1.01							

carinifer[13]

1.54	0.94	1.61	1.43	0.70	1.25	0.84	1.25	0.44	0.89	1.86	1.25	0.93
1.64	0.90	0.76	0.86	0.64	3.83	1.37	0.51	0.81	0.70	0.62	1.41	2.72
3.16	1.11	0.98	1.02	0.56	1.01							

chloroticus[1]

1.44	0.99	1.60	1.46	0.78	1.28	0.94	0.94	0.33	1.00	2.20	1.52	1.12
1.68	0.93	0.79	0.83	0.68	4.42	1.64	0.46	0.70	0.47	0.77	1.09	2.41
2.81	1.04	0.88	1.08	0.54	1.30							

chloroticus[2]

1.51	0.97	1.64	1.44	0.70	1.22	0.89	1.06	0.32	0.80	2.20	1.60	1.07
1.53	0.92	0.83	0.79	0.41	4.85	1.49	0.54	0.61	0.53	0.72	1.32	2.35
3.01	0.96	0.98	1.03	0.51	1.19							

concavus (holotype)

1.50	0.94	1.58	1.49	0.75	1.28	0.90	1.13	0.48	0.75	2.24	1.76	1.03
1.72	0.88	0.78	0.84	1.00	2.90	2.02	0.27	0.68	0.64	0.77	1.43	2.50
3.02	1.03	0.96	1.08	0.53	0.73							

concavus (paratype)[1]

1.59	0.94	1.51	1.40	0.74	1.36	0.84	1.18	0.44	0.84	2.24	1.66	1.06
1.67	0.92	0.81	0.85	0.86	2.61	1.98	0.26	0.70	0.67	0.73	1.42	2.43
3.02	1.05	0.97	1.06	0.58	0.71							

concavus (paratype)[2]

1.48	0.92	1.52	1.52	0.73	1.32	0.95	1.13	0.47	0.90	2.22	1.61	1.00
1.64	0.89	0.73	0.87	0.92	2.61	1.88	0.28	0.73	0.68	0.76	1.42	2.32
2.83	1.08	0.91	1.08	0.57	0.65							

concavus (paratype)[3]

1.57	0.92	1.59	1.51	0.68	1.44	0.87	1.04	0.45	0.89	2.06	1.56	0.98
1.67	0.88	0.77	0.86	0.97	2.13	1.98	0.25	0.70	0.68	0.72	1.44	2.03
2.68	1.04	0.89	1.06	0.65	0.47							

concavus (paratype)[4]

1.50	0.99	1.57	1.52	0.67	1.39	0.98	1.16	0.46	0.84	2.47	1.96	1.11
1.75	0.90	0.81	0.87	1.07	2.30	2.14	0.25	0.76	0.69	0.73	1.39	2.55
3.15	1.06	0.93	1.13	0.57	0.79							

concavus (paratype)[5]

1.49	1.02	1.50	1.49	0.68	1.43	0.93	1.12	0.44	0.85	2.50	1.75	0.97
1.79	0.89	0.71	0.90	0.94	2.35	1.87	0.29	0.80	0.72	0.74	1.55	2.37
2.84	1.07	0.98	1.06	0.59	0.80							

concavus (paratype)[6]

1.46	0.96	1.53	1.51	0.66	1.35	0.79	1.38	0.44	0.87	2.23	1.73	1.10
1.65	0.87	0.75	0.91	0.99	2.76	2.03	0.28	0.69	0.67	0.74	1.23	2.36
2.85	1.08	0.96	1.04	0.67	0.83							

concavus (paratype)[7]

1.51	0.99	1.55	1.55	0.64	1.42	0.95	1.05	0.46	0.84	2.13	1.56	1.08
1.73	0.91	0.74	0.87	1.06	2.11	1.84	0.30	0.78	0.76	0.77	1.39	2.37
2.91	1.05	0.96	1.05	0.61	0.56							

concavus (paratype)[8]

1.54	0.95	1.52	1.53	0.76	1.41	1.16	1.01	0.45	0.85	2.13	1.68	1.03
1.70	0.92	0.77	0.86	0.99	2.57	2.15	0.24	0.72	0.74	0.74	1.54	2.54
3.17	0.98	1.06	0.99	0.66	0.80							

concavus (paratype)[9]

1.48	0.95	1.52	1.55	0.65	1.48	0.86	1.41	0.43	0.88	2.39	1.66	1.02

1.69	0.88	0.76	0.90	0.97	2.42	2.23	0.25	0.71	0.66	0.80	1.43	2.21
2.95	1.02	0.98	1.05	0.55	0.82							
concavus (paratype)[10]												
1.46	0.92	1.53	1.51	0.73	1.35	0.86	1.12	0.44	0.84	2.50	1.60	1.07
1.74	0.92	0.75	0.90	0.97	2.30	1.87	0.30	0.71	0.76	0.72	1.55	2.37
2.95	1.06	0.89	1.11	0.58	0.80							
convexus (holotype)												
1.42	0.91	1.62	1.53	0.79	1.26	0.89	1.01	0.44	0.91	1.66	1.30	1.03
1.76	0.90	0.83	0.86	0.65	3.55	1.37	0.44	0.70	0.64	0.64	1.48	2.81
3.21	1.11	1.07	1.00	0.60	0.98							
convexus (paratype)[1]												
1.51	0.96	1.57	1.45	0.68	1.21	0.92	0.91	0.42	0.80	1.79	1.38	1.07
1.69	0.90	0.83	0.83	0.64	4.09	1.63	0.43	0.65	0.63	0.63	1.33	2.67
3.11	1.08	0.99	1.08	0.51	0.94							
convexus (paratype)[2]												
1.47	1.00	1.61	1.47	0.75	1.24	0.80	1.33	0.46	0.85	1.81	1.36	1.00
1.72	0.88	0.81	0.85	0.60	3.69	1.55	0.45	0.57	0.60	0.73	1.15	2.69
3.04	1.13	1.01	1.05	0.63	1.06							
convexus (paratype)[3]												
1.45	0.96	1.44	1.45	0.66	1.41	0.96	1.23	0.45	0.91	1.61	1.26	1.01
1.75	0.91	0.82	0.84	0.72	4.11	1.73	0.41	0.69	0.58	0.76	1.40	2.72
3.10	1.10	1.03	1.05	0.67	1.12							
convexus (paratype)[4]												
1.46	0.90	1.56	1.53	0.72	1.18	0.86	1.06	0.42	0.86	1.52	1.21	1.01
1.63	0.89	0.80	0.85	0.58	3.92	1.51	0.45	0.62	0.62	0.68	1.46	2.76
3.21	1.10	1.06	0.97	0.56	0.94							
convexus (paratype)[5]												
1.43	0.92	1.59	1.49	0.82	1.29	0.98	1.04	0.44	0.76	1.67	1.29	1.09
1.72	0.90	0.80	0.86	0.51	4.33	1.67	0.41	0.69	0.61	0.72	1.44	2.64
2.93	1.08	1.03	1.02	0.59	1.17							
convexus (paratype)[6]												
1.52	0.95	1.59	1.50	0.73	1.34	0.79	1.15	0.48	0.90	1.78	1.35	1.00
1.79	0.94	0.83	0.80	0.70	4.36	1.51	0.44	0.63	0.68	0.66	1.30	2.66

2.95 1.09 1.06 1.04 0.59 0.86

convexus (paratype)[7]

1.44 0.94 1.57 1.51 1.04 1.21 0.84 1.14 0.45 0.84 1.86 1.38 0.97

1.75 0.86 0.81 0.90 0.67 3.98 1.39 0.49 0.69 0.65 0.66 1.56 2.89

3.41 1.19 1.01 0.97 0.57 0.91

convexus (paratype)[8]

1.44 0.99 1.58 1.52 0.78 1.27 0.86 1.18 0.43 0.85 1.76 1.37 1.04

1.80 0.89 0.79 0.89 0.57 3.88 1.55 0.46 0.72 0.65 0.65 1.55 2.90

3.53 1.11 1.09 1.00 0.56 0.93

convexus (paratype)[9]

1.42 0.97 1.55 1.56 0.73 1.38 0.79 1.16 0.48 0.81 1.76 1.35 1.03

1.69 0.91 0.82 0.82 0.49 3.92 1.58 0.44 0.66 0.65 0.69 1.38 2.70

2.80 1.15 0.97 1.06 0.61 1.09

convexus (paratype)[10]

1.42 0.95 1.59 1.53 0.77 1.27 0.84 1.12 0.46 0.94 1.76 1.35 1.01

1.74 0.90 0.76 0.88 0.58 3.89 1.56 0.42 0.67 0.67 0.68 1.26 2.74

2.94 1.08 1.05 0.99 0.48 0.99

convexus (paratype)[11]

1.42 0.95 1.59 1.52 0.78 1.21 0.93 1.27 0.43 0.98 1.75 1.39 1.03

1.76 0.84 0.76 0.96 0.55 3.88 1.57 0.43 0.67 0.61 0.65 1.50 2.69

3.01 1.16 0.98 1.02 0.54 0.97

convexus (paratype)[12]

1.50 1.03 1.63 1.45 0.73 1.27 0.88 1.41 0.48 0.80 1.75 1.47 1.06

1.79 0.88 0.78 0.91 0.80 3.48 1.35 0.49 0.73 0.65 0.75 1.47 2.87

3.03 1.12 1.05 1.00 0.56 0.94

convexus (paratype)[13]

1.44 0.92 1.58 1.55 0.72 1.29 0.82 1.33 0.44 0.93 1.67 1.35 1.07

1.69 0.90 0.78 0.86 0.54 4.13 1.61 0.41 0.69 0.61 0.67 1.37 2.75

2.91 1.13 0.99 1.00 0.57 1.00

convexus (paratype)[14]

1.35 0.84 1.46 1.47 0.68 1.22 0.80 1.24 0.46 0.96 1.67 1.29 1.03

1.64 0.88 0.84 0.84 0.84 4.24 1.62 0.44 0.71 0.64 0.62 1.24 2.80

3.00 1.14 0.99 0.99 0.58 0.84

convexus (paratype)[15]

1.46	0.95	1.55	1.47	0.73	1.25	0.72	1.13	0.48	0.93	1.63	1.18	1.01
1.76	0.90	0.81	0.85	0.73	3.99	1.55	0.48	0.64	0.64	0.69	1.53	2.89
3.24	1.15	1.04	1.00	0.53	0.82							

convexus (paratype)[16]

1.44	0.91	1.60	1.56	0.76	1.37	0.82	1.00	0.43	0.91	1.60	1.33	1.00
1.69	0.84	0.80	0.90	0.69	3.90	1.47	0.47	0.69	0.69	0.71	1.41	2.78
3.16	1.14	1.03	1.01	0.63	0.93							

convexus (paratype)[17]

1.46	0.94	1.60	1.51	0.72	1.25	0.84	1.11	0.44	0.90	1.68	1.36	1.03
1.74	0.90	0.80	0.86	0.59	4.11	1.59	0.45	0.66	0.66	0.68	1.55	2.69
2.93	1.11	1.01	0.98	0.49	0.85							

convexus (paratype)[18]

1.48	0.93	1.60	1.47	0.75	1.29	0.75	1.13	0.49	0.89	1.63	1.19	0.97
1.76	0.93	0.83	0.81	0.53	4.06	1.46	0.46	0.66	0.60	0.75	1.33	2.74
3.09	1.10	1.07	1.02	0.53	0.81							

convexus (paratype)[19]

1.41	0.89	1.51	1.52	0.71	1.34	0.88	0.88	0.45	0.88	1.66	1.19	0.97
1.67	0.87	0.81	0.88	0.62	3.58	1.42	0.44	0.61	0.62	0.70	1.29	2.43
2.81	1.08	0.97	1.05	0.60	0.92							

denticulatus (holotype)

1.50	0.96	1.32	1.65	0.47	1.36	1.02	0.62	0.58	0.57	2.53	1.85	1.06
1.78	0.82	0.38	0.98	1.86	1.65	1.34	0.30	0.80	0.71	0.71	2.17	0.74
2.45	0.42	0.88	0.96	0.34	0.81							

denticulatus (paratype)

1.53	0.91	1.37	1.74	0.48	1.30	1.20	0.64	0.55	0.74	2.60	1.68	1.12
1.68	0.84	0.35	1.05	2.10	1.76	1.28	0.30	0.77	0.75	0.74	2.08	0.67
2.40	0.37	0.94	0.95	0.33	0.91							

denticulatus (paratype)

1.43	0.88	1.24	1.72	0.52	1.44	1.04	0.63	0.54	0.63	2.35	1.65	1.07
1.63	0.80	0.38	1.06	1.85	2.31	1.37	0.34	0.86	0.63	0.79	2.02	0.67
2.35	0.38	0.88	0.97	0.42	0.74							

denticulatus (paratype)

1.55	0.94	1.31	1.69	0.53	1.34	0.98	0.54	0.56	0.83	2.61	1.72	1.04
1.72	0.80	0.36	1.09	2.58	1.95	1.23	0.34	0.69	0.82	0.91	2.01	0.77
2.30	0.42	0.93	0.97	0.32	0.80							

denticulatus (paratype)

1.54	0.93	1.36	1.70	0.50	1.35	1.05	0.58	0.57	0.75	2.50	1.70	1.10
1.70	0.82	0.37	1.05	1.90	2.00	1.28	0.33	0.70	0.79	0.79	2.08	0.70
2.40	0.40	0.90	0.96	0.33	0.80							

disgregus (holotype)

1.48	0.86	1.44	1.60	0.64	1.30	0.86	0.98	0.37	0.76	2.11	1.09	1.05
1.52	0.82	0.77	0.93	0.84	2.93	1.63	0.40	0.74	0.67	0.66	1.32	1.62
2.41	1.26	0.74	0.95	0.54	0.82							

disgregus (paratype)[1]

1.31	0.99	1.42	1.90	0.76	1.34	0.87	0.88	0.38	0.61	2.32	1.98	1.07
1.65	0.88	0.80	0.92	0.87	2.58	1.53	0.41	0.75	0.63	0.62	1.37	1.70
2.25	1.20	0.76	1.01	0.48	0.99							

disgregus (paratype)[2]

1.37	0.95	1.51	1.93	0.75	1.22	0.76	0.90	0.32	0.61	1.99	1.69	1.05
1.58	0.82	0.79	0.96	0.83	2.90	1.68	0.36	0.59	0.66	0.67	1.39	1.75
2.23	1.14	0.83	0.94	0.50	1.14							

disgregus (paratype)[3]

1.31	0.87	1.50	2.07	0.79	1.23	0.81	0.85	0.34	0.83	2.16	1.80	1.10
1.52	0.87	0.79	0.89	0.62	3.13	1.68	0.34	0.74	0.68	0.67	1.15	1.57
2.61	1.16	0.78	1.01	0.48	0.89							

disgregus (paratype)[4]

1.45	0.98	1.47	1.74	0.76	1.31	0.86	0.90	0.34	0.60	2.18	1.74	1.10
1.69	0.86	0.81	0.92	0.69	2.34	1.55	0.38	0.75	0.67	0.60	1.26	1.63
2.24	1.36	0.63	1.02	0.61	1.09							

disgregus (paratype)[5]

1.41	0.87	1.47	1.83	0.76	1.24	0.97	0.93	0.38	0.68	2.21	1.67	1.02
1.52	0.79	0.78	0.92	0.78	2.75	1.53	0.41	0.71	0.69	0.65	1.23	1.66
2.45	1.23	0.77	0.99	0.47	0.71							

femoralis (holotype)

1.42	0.96	1.58	1.42	0.71	1.42	0.90	0.83	0.36	0.92	2.16	1.26	1.04
1.63	0.90	0.78	0.82	0.34	4.68	1.60	0.48	0.71	0.67	0.74	1.23	2.09
2.61	0.98	0.85	1.12	0.51	0.98							

femoralis (paratype)[1]

1.41	0.97	1.62	1.42	0.72	1.42	0.83	1.03	0.35	0.93	2.11	1.29	1.01
1.70	0.92	0.81	0.81	0.34	4.78	1.58	0.49	0.76	0.64	0.80	1.32	2.08
2.65	0.96	0.96	1.08	0.39	1.58							

femoralis (paratype)[2]

1.41	1.03	1.66	1.43	0.70	1.36	1.01	1.00	0.44	0.83	2.04	1.41	1.00
1.73	0.90	0.84	0.83	0.36	4.78	1.74	0.47	0.69	0.77	0.64	1.24	2.00
2.39	0.95	0.92	1.08	0.40	1.31							

femoralis (paratype)[3]

1.47	1.05	1.59	1.43	0.70	1.48	0.84	1.10	0.34	0.91	2.21	1.46	1.01
1.62	0.86	0.80	0.85	0.33	4.09	1.64	0.46	0.70	0.64	0.79	1.22	2.21
2.58	1.03	0.89	1.03	0.40	0.83							

femoralis (paratype)[4]

1.45	1.05	1.60	1.46	0.69	1.39	0.74	1.31	0.36	0.83	2.29	1.45	1.04
1.68	0.91	0.83	0.80	0.40	5.41	1.64	0.49	0.73	0.66	0.81	1.13	2.33
2.77	0.95	0.95	1.13	0.38	1.18							

ferrugineus (holotype)

1.49	1.01	1.47	1.44	0.54	1.32	0.90	0.78	0.41	0.91	2.16	1.48	0.94
1.65	0.92	0.77	0.84	0.58	3.87	1.33	0.55	0.83	0.77	0.76	1.34	2.37
2.64	1.06	0.92	1.05	0.53	1.16							

garamantis (holotype)

1.49	0.97	1.62	1.35	0.66	1.14	0.88	1.48	0.37	0.86	1.81	1.49	1.02
1.64	0.92	0.77	0.85	0.52	4.05	1.69	0.42	0.74	0.67	0.73	1.01	2.19
2.57	0.97	0.96	1.10	0.59	1.01							

garamantis[1]

1.49	1.08	1.69	1.36	0.71	1.27	0.81	1.54	0.43	0.97	1.68	1.40	1.08
1.75	0.97	0.78	0.82	0.41	4.19	1.85	0.37	0.76	0.73	0.71	5.45	2.63
2.89	1.00	4.20	0.26	0.56	1.42							

garamantis[2]

1.49	1.11	1.66	1.34	0.70	1.36	0.81	1.67	0.41	0.89	1.76	1.48	1.08
1.68	0.92	0.76	0.86	0.45	4.15	1.75	0.40	0.78	0.75	0.65	0.92	2.40
2.80	1.00	0.97	1.09	0.54	0.90							

garamantis[3]

1.47	1.06	1.67	1.35	0.76	1.26	0.83	1.32	0.42	0.90	1.89	1.49	1.03
1.69	0.93	0.77	0.82	0.47	4.05	1.68	0.43	0.67	0.74	0.68	1.44	2.45
2.83	1.07	0.94	1.09	0.57	1.04							

garamantis[4]

1.46	1.00	1.58	1.36	0.68	1.29	0.86	1.40	0.41	0.89	1.70	1.34	1.06
1.69	0.97	0.77	0.79	0.50	4.55	1.78	0.44	0.69	0.70	0.74	1.38	2.42
2.85	0.95	1.06	1.05	0.56	1.48							

garamantis[5]

1.48	1.09	1.66	1.31	0.71	1.27	0.83	1.57	0.42	0.78	1.98	1.52	1.02
1.72	0.93	0.78	0.83	0.57	4.79	1.72	0.48	0.81	0.78	0.64	1.52	2.55
2.75	1.02	1.03	1.04	0.47	0.88							

garamantis[6]

1.56	1.13	1.63	1.28	0.61	1.34	0.85	1.34	0.47	0.81	1.87	1.54	1.05
1.85	0.93	0.77	0.84	0.46	4.87	1.62	0.55	0.73	0.74	0.71	1.66	2.62
3.22	1.03	1.07	1.05	0.54	0.77							

garamantis[7]

1.51	1.04	1.58	1.26	0.68	1.26	0.84	1.46	0.42	0.88	1.70	1.43	1.09
1.82	0.94	0.80	0.85	0.54	4.36	1.62	0.49	0.71	0.65	0.70	1.31	2.77
3.47	1.05	1.04	1.08	0.55	1.69							

imbellis[1]

1.44	0.93	1.46	1.51	0.78	1.27	0.87	1.60	0.39	0.83	2.10	1.63	1.03
1.67	0.89	0.76	0.88	1.13	2.18	1.68	0.29	0.68	0.72	0.61	1.26	1.94
2.45	1.06	0.83	1.12	0.52	0.99							

imbellis[2]

1.38	0.97	1.48	1.62	0.65	1.27	0.84	1.47	0.37	0.83	2.31	1.63	1.07
1.65	0.93	0.77	0.87	1.00	2.28	1.90	0.29	0.75	0.69	0.69	1.46	2.19
2.52	1.08	0.89	1.04	0.50	1.02							

imbellis[3]

1.45 1.01 1.51 1.46 0.70 1.38 0.91 1.36 0.40 0.86 2.10 1.62 0.94
1.62 0.92 0.72 0.88 1.11 2.39 1.66 0.30 0.71 0.74 0.61 1.42 1.90
2.38 1.05 0.85 1.06 0.48 0.79

imbellis[4]

1.41 0.99 1.55 1.51 0.80 1.35 0.84 1.60 0.35 0.86 2.27 1.79 0.97
1.72 0.91 0.79 0.87 1.23 2.40 1.43 0.36 0.83 0.65 0.65 1.47 2.13
2.53 1.19 0.85 1.05 0.52 0.75

imbellis[5]

1.55 1.01 1.56 1.45 0.63 1.29 0.90 1.53 0.42 0.82 2.07 1.61 0.98
1.73 0.89 0.75 0.89 1.34 2.20 1.49 0.34 0.69 0.69 0.58 1.47 2.15
2.59 1.16 0.89 1.05 0.55 0.94

imbellis[6]

1.37 0.91 1.52 1.61 0.80 1.27 0.76 1.29 0.37 0.93 2.09 1.56 1.04
1.63 0.89 0.75 0.91 1.03 2.49 2.22 0.24 0.72 0.69 0.62 1.33 1.99
2.30 1.01 0.87 1.07 0.54 0.83

imbellis[7]

1.38 0.86 1.50 1.62 0.75 1.40 0.93 1.51 0.34 0.87 2.14 1.44 0.90
1.59 0.83 0.79 0.94 1.27 2.35 1.52 0.31 0.78 0.75 0.72 1.21 1.79
2.32 1.14 0.77 1.05 0.51 0.80

imbellis[8]

1.46 0.93 1.57 1.50 0.75 1.27 0.91 1.06 0.39 0.77 2.31 1.82 1.10
1.60 0.90 0.76 0.85 1.18 2.04 2.04 0.21 0.73 0.69 0.67 1.38 1.76
2.28 1.09 0.80 1.06 0.56 0.60

imbellis[9]

1.39 0.94 1.48 1.72 0.63 1.23 0.85 1.25 0.35 0.80 2.33 1.59 1.00
1.67 0.87 0.81 0.89 1.10 2.25 1.75 0.30 0.73 0.71 0.65 1.39 1.97
2.32 1.11 0.83 1.05 0.56 0.89

imbellis[10]

1.46 0.89 1.54 1.66 0.75 1.29 0.91 1.08 0.35 0.87 2.15 1.75 1.08
1.52 0.87 0.73 0.89 1.10 2.32 2.06 0.29 0.70 0.71 0.74 1.13 1.64
2.21 0.95 0.84 1.05 0.49 0.89

imbellis[11]

1.40 0.92 1.56 1.59 0.71 1.36 0.87 1.35 0.38 0.75 2.23 1.47 1.04

1.73	0.90	0.78	0.88	1.26	2.42	2.32	0.20	0.81	0.70	0.74	1.26	1.85
2.16	1.02	0.88	1.05	0.53	0.68							
imbellis[12]												
1.41	0.89	1.50	1.62	0.72	1.28	0.97	1.09	0.38	0.78	2.10	1.59	1.06
1.65	0.89	0.76	0.89	1.29	2.40	1.88	0.28	0.73	0.71	0.59	1.44	1.81
2.16	1.06	0.82	1.02	0.51	0.82							
imbellis[13]												
1.45	0.99	1.58	1.51	0.70	1.27	0.89	0.89	0.45	0.93	2.05	1.50	1.00
1.64	0.90	0.76	0.87	1.21	2.28	1.94	0.23	0.75	0.75	0.58	1.23	2.02
2.44	1.07	0.88	1.11	0.53	0.79							
imbellis[14]												
1.40	0.91	1.58	1.56	0.84	1.23	0.83	1.12	0.39	0.81	2.12	1.75	1.15
1.60	0.93	0.76	0.84	1.18	2.07	2.06	0.23	0.77	0.73	0.66	1.30	1.64
2.28	1.12	0.76	1.11	0.47	0.62							
imbellis[15]												
1.43	1.03	1.47	1.52	0.68	1.33	0.79	1.36	0.38	0.86	2.11	1.72	1.10
1.82	0.91	0.71	0.93	1.31	2.80	2.65	0.21	0.77	0.73	0.68	1.53	2.14
2.66	1.06	0.98	1.05	0.40	0.92							
imbellis[16]												
1.43	0.97	1.49	1.53	0.69	1.31	0.92	1.31	0.39	0.89	2.34	1.71	1.02
1.72	0.87	0.80	0.88	1.23	2.35	2.03	0.25	0.76	0.57	0.70	1.34	1.99
2.39	1.10	0.87	1.04	0.55	1.04							
imbellis[17]												
1.39	0.95	1.55	1.60	0.79	1.36	0.91	1.27	0.37	0.79	2.21	1.49	1.02
1.68	0.90	0.81	0.89	1.07	2.20	1.93	0.26	0.76	0.73	0.63	1.16	1.67
1.96	0.91	0.85	1.08	0.56	0.96							
imbellis[18]												
1.35	0.84	1.48	1.59	0.74	1.34	0.90	1.48	0.35	0.87	2.04	1.64	1.10
1.45	0.87	0.73	0.90	1.29	2.07	2.29	0.21	0.75	0.70	0.63	1.30	1.68
1.93	0.90	0.84	1.01	0.44	0.63							
imbellis[19]												
1.36	1.00	1.60	1.58	0.78	1.24	0.76	1.34	0.36	0.83	2.00	1.65	1.19
1.71	0.90	0.73	0.88	1.28	2.30	1.63	0.29	0.76	0.72	0.57	1.41	2.06
2.57	1.10	0.91	1.08	0.46	0.68							

semele (lectotype)

1.46	0.90	1.48	1.51	0.68	1.43	0.79	1.25	0.42	0.89	2.11	1.61	1.07
1.59	0.89	0.75	0.87	1.00	2.43	1.80	0.30	0.75	0.61	0.65	1.32	1.69
2.22	1.05	0.83	1.09	0.49	0.70							

semele (paralectotype)[1]

1.52	0.94	1.52	1.52	0.68	1.18	0.91	1.70	0.42	1.05	1.71	1.39	1.04
1.73	0.91	0.76	0.89	0.77	3.46	1.40	0.47	0.68	0.63	0.78	1.47	2.77
3.14	1.15	1.01	0.92	0.46	1.35							

semele (paralectotype)[2]

1.53	0.95	1.55	1.50	0.65	1.31	0.84	1.15	0.38	0.76	2.18	1.76	1.06
1.80	0.91	0.81	0.82	1.14	2.54	1.59	0.32	0.70	0.59	0.66	1.38	1.86
2.22	1.10	0.83	1.09	0.48	0.95							

semele (paralectotype)[3]

1.46	0.97	1.58	1.53	0.71	1.31	0.83	1.17	0.36	0.81	2.18	1.83	1.12
1.72	0.94	0.75	0.84	1.36	2.47	1.61	0.30	0.71	0.69	0.64	1.34	1.96
2.75	1.13	0.84	1.11	0.41	0.68							

semele (paralectotype)[4]

1.50	0.88	1.45	1.56	0.52	1.32	0.86	0.89	0.33	0.71	3.01	1.89	1.08
1.68	0.92	0.74	0.86	1.78	2.23	1.32	0.33	0.73	0.71	0.75	1.38	1.86
2.22	1.16	0.81	1.06	0.52	0.75							

indistinctus (holotype)

1.39	1.04	1.49	1.39	0.61	1.46	0.89	1.30	0.40	0.94	2.25	1.52	1.09
1.77	0.93	0.84	0.83	0.79	4.18	1.36	0.47	0.62	0.69	0.77	1.55	2.50
3.05	1.03	1.05	1.07	0.44	1.37							

indistinctus (paratype)[1]

1.46	1.05	1.51	1.38	0.64	1.43	0.82	1.00	0.42	0.83	2.29	1.44	0.97
1.72	0.89	0.80	0.85	0.54	3.63	1.53	0.45	0.84	0.81	0.82	1.30	2.42
2.91	1.06	0.99	1.06	0.46	1.38							

indistinctus (paratype)[2]

1.46	0.99	1.51	1.37	0.67	1.36	0.89	1.00	0.41	0.83	2.14	1.48	1.04
1.72	0.89	0.80	0.86	0.37	3.33	1.56	0.41	0.72	0.65	0.83	1.31	2.32
2.80	1.02	1.05	1.02	0.43	1.61							

indistinctus (paratype)[3]

1.46	1.05	1.51	1.39	0.64	1.42	0.85	1.02	0.42	0.83	2.14	1.47	1.06
1.74	0.93	0.73	0.82	0.50	4.02	1.57	0.48	0.84	0.82	0.79	1.41	2.38
2.98	1.05	0.99	1.07	0.54	1.62							

indistinctus (paratype)[4]

1.30	1.00	1.50	1.39	0.64	1.40	0.90	1.00	0.41	0.85	2.18	1.45	1.04
1.77	0.90	0.75	0.85	0.44	4.00	1.55	0.43	0.80	0.84	0.79	1.55	2.42
2.86	1.02	1.03	1.04	0.49	1.40							

inornatus (holotype)

1.44	0.84	1.46	1.50	0.71	1.41	0.89	1.48	0.37	0.85	2.06	1.73	0.98
1.68	0.90	0.83	0.86	1.52	2.04	1.37	0.37	0.76	0.64	0.65	1.08	1.89
2.38	1.07	0.79	1.05	0.61	0.70							

inornatus (paratype)[1]

1.45	1.11	1.44	1.61	0.53	1.29	0.88	1.40	0.33	0.86	2.21	1.53	1.04
2.02	0.91	0.81	0.94	1.85	2.57	1.93	0.33	0.73	0.66	0.70	1.46	2.12
2.61	1.09	0.95	1.02	0.57	0.68							

inornatus (paratype)[2]

1.45	0.98	1.64	1.69	0.78	1.24	0.88	1.38	0.35	0.87	1.86	1.34	1.13
1.79	0.91	0.76	0.90	1.98	2.31	1.35	0.34	0.76	0.64	0.71	1.50	1.87
2.58	1.06	0.85	1.04	0.53	0.54							

inornatus (paratype)[3]

1.42	0.91	1.58	1.63	0.70	1.18	0.93	1.19	0.36	0.82	1.84	1.30	1.03
1.70	0.90	0.77	0.89	1.64	2.61	1.74	0.28	0.73	0.63	0.70	1.51	1.72
2.24	1.02	0.82	0.99	0.60	0.55							

inornatus (paratype)[4]

1.50	0.98	1.51	1.49	0.59	1.29	0.82	1.54	0.36	0.86	1.92	1.46	1.12
1.71	0.97	0.79	0.81	1.38	2.61	1.69	0.30	0.72	0.73	0.66	1.54	1.77
2.20	1.09	0.80	1.00	0.60	0.57							

inornatus (paratype)[5]

1.43	0.91	1.48	1.65	0.64	1.35	0.86	1.44	0.37	0.89	2.27	1.82	0.94
1.71	0.97	0.81	0.83	2.16	2.02	1.32	0.36	0.78	0.79	0.66	1.54	2.04
2.51	1.07	0.86	1.02	0.60	0.88							

inornatus (paratype)[6]

1.43	0.99	1.68	1.61	0.77	1.28	0.85	1.22	0.36	0.90	1.98	1.68	0.99
1.79	0.87	0.84	0.92	1.62	2.14	1.81	0.25	0.79	0.73	0.64	1.41	1.82
2.18	1.07	0.79	1.03	0.63	0.63							

lividus (holotype)

1.46	0.95	1.55	1.45	0.68	1.37	0.81	1.40	0.40	0.82	2.11	1.68	1.03
1.75	0.87	0.78	0.90	1.08	2.64	2.02	0.30	0.73	0.75	0.62	1.47	2.55
3.09	1.14	0.96	0.99	0.50	0.85							

lividus[1]

1.40	0.96	1.54	1.40	0.70	1.23	1.06	1.05	0.39	0.90	2.00	1.55	0.98
1.83	0.87	0.80	0.86	0.89	2.50	1.59	0.27	0.67	0.65	0.75	1.20	2.00
2.50	0.99	0.89	1.00	0.50	1.20							

lividus[2]

1.48	1.00	1.62	1.51	0.79	1.35	0.90	1.10	0.42	0.86	1.95	1.70	1.06
1.90	0.87	0.83	0.88	0.93	3.00	1.69	0.30	0.54	0.75	0.64	1.29	1.87
2.00	0.92	0.87	1.06	0.49	0.98							

lividus[3]

1.49	1.00	1.59	1.49	0.75	1.30	1.00	1.30	0.43	0.96	2.20	1.75	1.00
1.78	0.88	0.81	0.86	1.04	2.87	1.65	0.32	0.59	0.70	0.80	1.18	1.90
2.24	0.83	0.95	1.05	0.43	1.00							

lividus[4]

1.51	0.96	1.56	1.45	0.74	1.25	1.06	1.42	0.39	0.84	1.82	1.55	1.09
1.75	0.88	0.81	0.86	0.89	2.58	1.67	0.24	0.67	0.62	0.70	1.09	1.90
2.15	0.95	0.89	1.07	0.49	1.13							

lividus[5]

1.49	1.09	1.45	1.54	0.68	1.56	1.07	1.13	0.47	0.93	2.24	1.65	0.97
2.08	1.08	0.76	0.86	0.88	2.68	1.85	0.29	0.57	0.77	0.81	1.29	2.09
2.64	0.96	0.90	1.34	0.41	1.30							

lividus[6]

1.49	0.88	1.45	1.50	0.72	1.23	1.11	1.73	0.37	0.85	2.38	1.81	0.98
1.65	0.86	0.77	0.88	1.74	2.36	1.89	0.31	0.50	0.93	0.59	1.42	1.62
2.21	0.84	0.85	1.09	0.42	1.35							

lividus[7]

1.59	0.95	1.57	1.40	0.75	1.40	1.08	1.25	0.46	0.94	1.92	1.70	1.03
1.64	0.87	0.81	0.89	0.87	2.52	1.77	0.30	0.73	0.73	0.65	1.18	1.80
2.22	1.00	0.83	1.10	0.40	1.00							

lividus[8]

1.50	0.96	1.59	1.46	0.80	1.27	0.91	1.29	0.46	0.85	2.01	1.67	1.06
1.75	0.87	0.85	0.88	1.00	2.50	1.53	0.31	0.73	0.75	0.66	1.30	1.94
2.21	0.90	0.90	1.05	0.41	0.91							

lividus[9]

1.54	1.00	1.55	1.44	0.75	1.43	1.00	1.43	0.42	1.04	2.19	1.75	1.00
1.75	0.86	0.83	0.90	0.91	3.20	1.60	0.31	0.77	0.76	0.60	1.31	1.76
1.95	0.92	0.87	1.06	0.42	0.78							

lividus[10]

1.37	0.98	1.56	1.69	0.72	1.20	1.08	1.05	0.43	0.92	2.42	1.84	1.02
1.75	0.88	0.82	0.85	1.13	2.37	1.53	0.36	0.70	0.69	0.68	1.25	1.75
2.15	0.83	0.91	1.10	0.40	1.29							

lividus[11]

1.60	1.04	1.62	1.38	0.74	1.22	0.85	1.09	0.43	0.88	2.22	1.95	1.20
1.75	0.86	0.83	0.86	1.17	2.15	1.62	0.31	0.70	0.70	0.68	1.17	1.89
2.21	0.89	0.93	1.04	0.40	0.96							

lividus[12]

1.43	0.98	1.54	1.50	0.74	1.41	0.97	1.17	0.43	0.86	1.93	1.63	1.12
1.82	0.87	0.82	0.89	1.01	2.53	1.64	0.33	0.70	0.76	0.69	1.47	1.96
2.26	0.95	0.95	1.06	0.52	0.99							

lividus[13]

1.47	0.99	1.63	1.50	0.80	1.25	1.04	1.11	0.38	0.88	2.03	1.64	1.06
1.87	0.92	0.83	0.80	1.00	2.56	1.50	0.33	0.68	0.71	0.65	1.14	1.85
2.26	0.84	0.92	1.16	0.43	0.88							

lividus[14]

1.48	1.13	1.54	1.55	0.74	1.59	1.06	1.75	0.39	0.85	2.22	1.89	1.17
1.96	1.07	0.80	0.85	0.84	2.61	1.77	0.31	0.00	0.68	0.69	1.03	1.62
2.25	0.89	0.85	1.29	0.46	0.92							

lividus[15]

1.36	0.97	1.48	1.63	0.74	1.27	0.94	1.14	0.43	0.81	2.04	1.79	1.10

1.79	0.92	0.83	0.94	1.12	2.32	1.70	0.29	0.72	0.76	0.65	1.51	1.98
2.37	0.90	0.99	1.09	0.47	0.93							
lividus[16]												
1.52	0.98	1.58	1.58	0.73	1.36	0.91	1.26	0.44	0.85	2.13	1.70	1.10
1.64	0.82	0.82	0.92	0.85	2.29	1.39	0.40	0.76	0.71	0.66	1.37	1.75
2.15	0.87	0.89	0.97	0.46	0.86							
longicarinatus (holotype)												
1.43	0.99	1.62	1.50	0.76	1.26	0.77	1.05	0.42	1.09	1.79	1.22	1.03
1.79	0.89	0.86	0.86	0.43	4.03	1.54	0.47	0.75	0.72	0.63	1.49	2.61
2.86	1.01	1.05	1.05	0.53	1.07							
longicarinatus (paratype)[1]												
1.53	0.93	1.59	1.53	0.76	1.33	0.77	1.13	0.42	1.18	1.64	1.30	0.99
1.72	0.86	0.86	0.84	0.42	4.46	1.59	0.51	0.83	0.80	0.59	1.37	2.58
2.83	1.04	1.04	0.98	0.52	0.96							
longicarinatus (paratype)[2]												
1.47	0.95	1.49	1.55	0.72	1.27	0.82	1.06	0.42	1.18	1.65	1.36	1.00
1.86	0.92	0.83	0.84	0.41	4.28	1.72	0.46	0.83	0.81	0.53	1.33	2.67
2.99	1.07	1.02	1.02	0.61	0.96							
longicarinatus (paratype)[3]												
1.40	0.92	1.51	1.53	0.73	1.34	0.86	1.07	0.39	1.08	1.72	1.33	1.08
1.78	0.94	0.80	0.85	0.54	4.23	1.58	0.45	0.74	0.73	0.58	1.44	2.74
2.81	1.01	1.06	1.00	0.58	0.72							
luridus (holotype)												
1.51	0.99	1.65	1.30	0.71	1.32	0.77	1.13	0.43	0.87	2.05	1.46	0.93
1.82	0.85	0.76	0.85	0.46	4.05	1.65	0.44	0.77	0.62	0.85	1.42	2.70
2.75	0.98	0.94	0.99	0.51	1.58							
luridus (paratype)[1]												
1.45	0.98	1.36	1.39	0.52	1.53	0.86	1.16	0.42	0.90	2.22	1.55	1.04
1.57	0.93	0.81	0.82	0.71	3.34	1.60	0.43	0.91	0.74	0.63	1.33	2.21
2.82	0.87	1.02	1.03	0.43	1.37							
luridus (paratype)[2]												
1.53	1.06	1.66	1.29	0.63	1.33	0.85	1.22	0.40	0.82	2.01	1.45	1.07

1.72	0.91	0.82	0.79	0.59	4.18	1.61	0.41	0.74	0.71	0.76	1.39	2.53
2.80	1.13	0.91	1.06	0.53	1.21							
luridus (paratype)[3]												
1.57	1.01	1.66	1.23	0.74	1.33	0.85	1.24	0.42	0.86	2.00	1.37	1.05
1.78	0.90	0.84	0.85	0.45	3.74	1.41	0.48	0.79	0.75	0.76	1.16	2.20
2.60	1.06	0.90	1.02	0.47	1.17							
mandibularis[1]												
1.47	0.99	1.52	1.54	0.70	1.32	0.86	0.97	0.35	1.27	2.02	1.27	1.07
1.55	0.92	0.77	0.85	0.43	5.41	1.70	0.51	0.79	0.62	0.73	1.21	2.35
2.59	0.98	0.98	1.01	0.47	1.28							
mandibularis[2]												
1.43	0.96	1.46	1.61	0.70	1.40	0.87	1.19	0.26	1.30	2.12	1.33	0.97
1.53	0.91	0.82	0.82	0.44	4.72	1.55	0.49	0.76	0.76	0.71	1.10	2.29
2.92	1.03	0.92	1.08	0.44	1.36							
marmaricus (holotype)												
1.49	0.80	1.37	1.48	0.66	1.20	0.83	1.31	0.37	0.89	1.74	1.33	1.00
1.50	0.90	0.80	0.86	0.75	3.09	1.30	0.50	0.71	0.66	0.81	1.20	2.18
3.20	0.97	0.91	0.97	0.48	0.96							
marmaricus[1]												
1.43	0.80	1.51	1.60	0.77	1.11	0.98	1.38	0.38	0.98	1.74	1.24	1.00
1.45	0.88	0.76	0.91	0.86	2.95	1.49	0.49	0.69	0.69	0.63	1.13	1.91
2.98	0.96	0.85	1.05	0.53	0.94							
marmaricus[2]												
1.53	0.78	1.48	1.51	0.64	1.08	0.85	1.57	0.38	0.91	1.65	1.29	1.04
1.52	0.89	0.74	0.88	0.76	3.35	1.55	0.50	0.73	0.67	0.70	1.33	2.02
3.00	0.92	0.94	0.98	0.45	0.78							
marmaricus[3]												
1.55	0.82	1.53	1.53	0.73	1.25	0.85	1.54	0.35	0.93	1.62	1.36	1.06
1.53	0.91	0.76	0.87	0.71	3.25	1.64	0.44	0.73	0.68	0.73	1.18	1.90
2.95	0.96	0.90	1.04	0.50	0.93							
marmaricus[4]												
1.45	0.79	1.51	1.48	0.71	1.15	0.90	1.55	0.37	0.91	1.57	1.30	1.06

1.53	0.89	0.79	0.87	0.77	3.18	1.57	0.47	0.76	0.65	0.67	1.20	2.09
3.03	1.04	0.89	0.97	0.47	0.97							
niloticus (holotype)												
1.43	0.94	1.52	1.46	0.70	1.34	0.78	1.28	0.46	0.86	2.11	1.36	1.03
1.68	0.90	0.84	0.81	0.58	3.53	1.31	0.49	0.75	0.69	0.68	1.20	2.18
2.45	1.01	0.95	1.03	0.53	1.11							
niloticus (paratype)[1]												
1.48	1.00	1.53	1.42	0.64	1.30	0.84	1.69	0.34	0.84	1.86	1.28	0.98
1.72	0.91	0.84	0.85	0.48	3.69	1.53	0.47	0.75	0.80	0.71	1.32	2.51
2.63	1.05	0.98	1.00	0.42	1.43							
niloticus (paratype)[2]												
1.36	0.90	1.51	1.59	0.72	1.32	0.81	1.64	0.37	0.87	2.04	1.38	1.00
1.57	0.87	0.82	0.83	0.47	3.44	1.37	0.50	0.67	0.64	0.75	1.26	2.39
2.66	1.03	1.00	0.91	0.39	1.67							
niloticus (paratype)[3]												
1.50	0.98	1.50	1.36	0.63	1.35	0.85	1.53	0.38	0.83	1.93	1.36	1.06
1.73	0.93	0.78	0.83	0.54	3.87	1.66	0.45	0.81	0.67	0.75	1.47	2.38
2.91	1.02	0.95	1.05	0.47	1.25							
niloticus (paratype)[4]												
1.46	0.96	1.53	1.43	0.68	1.29	0.89	1.66	0.33	0.90	1.99	1.26	1.02
1.64	0.91	0.83	0.83	0.40	3.47	1.23	0.63	0.79	0.68	0.69	1.22	2.25
2.67	1.03	0.96	1.01	0.46	1.35							
niloticus (paratype)[5]												
1.48	0.98	1.54	1.31	0.61	1.31	0.89	1.64	0.36	0.85	1.94	1.27	0.98
1.67	0.92	0.77	0.84	0.47	3.58	1.44	0.48	0.70	0.60	0.77	1.00	2.26
2.62	1.09	0.87	1.11	0.54	1.27							
niloticus (paratype)[6]												
1.45	0.97	1.61	1.41	0.72	1.37	0.89	1.62	0.39	0.92	2.07	1.29	1.00
1.64	0.87	0.82	0.87	0.37	4.03	1.51	0.51	0.75	0.64	0.67	1.30	1.25
1.47	0.56	0.97	0.98	0.52	1.21							
niloticus (paratype)[7]												
1.39	0.98	1.53	1.47	0.69	1.35	0.86	1.59	0.37	0.86	2.00	1.40	0.98
1.67	0.92	0.82	0.83	0.48	3.36	1.33	0.58	0.76	0.67	0.77	1.33	2.42

2.64	1.04	0.99	0.97	0.43	1.50							
niloticus (paratype)[8]												
1.38	0.97	1.50	1.50	0.69	1.38	0.90	1.60	0.37	0.91	2.04	1.24	0.90
1.67	0.86	0.80	0.87	0.60	3.52	1.49	0.51	0.76	0.78	0.71	1.21	2.43
2.81	1.03	0.97	0.98	0.44	1.49							
niloticus (paratype)[9]												
1.45	0.99	1.57	1.41	0.69	1.30	0.90	1.58	0.39	0.83	1.83	1.35	1.04
1.67	0.92	0.80	0.83	0.32	3.76	1.61	0.45	0.76	0.63	0.73	1.27	2.26
2.64	1.12	0.91	0.98	0.46	1.34							
niloticus[1]												
1.49	0.99	1.60	1.34	0.72	1.34	0.89	1.69	0.40	0.88	2.03	1.41	1.04
1.63	0.92	0.81	0.88	0.59	3.39	1.27	0.51	0.68	0.69	0.72	1.17	2.00
2.73	0.91	0.93	1.07	0.53	1.40							
niloticus[2]												
1.42	0.97	1.62	1.45	0.75	1.27	0.89	1.31	0.37	0.87	1.77	1.29	1.10
1.63	0.91	0.77	0.84	0.56	3.77	1.57	0.43	0.63	0.71	0.71	1.19	2.33
2.95	0.97	0.99	1.03	0.46	1.48							
niloticus[3]												
1.46	0.98	1.51	1.39	0.66	1.36	0.92	1.21	0.40	0.86	1.87	1.47	1.04
1.64	0.89	0.81	0.86	0.61	3.24	1.39	0.48	0.71	0.63	0.75	1.28	2.37
2.81	1.02	0.95	1.10	0.44	1.50							
niloticus[4]												
1.48	0.95	1.65	1.43	0.70	1.23	0.94	1.43	0.40	0.80	1.96	1.37	1.00
1.68	0.92	0.79	0.85	0.48	3.17	1.35	0.52	0.81	0.70	0.80	1.39	2.43
2.78	1.09	0.90	1.05	0.52	0.99							
niloticus[5]												
1.48	1.01	1.61	1.39	0.67	1.36	0.94	1.28	0.41	0.96	1.95	1.33	0.97
1.67	0.90	0.76	0.84	0.53	3.53	1.36	0.54	0.77	0.61	0.82	1.26	2.27
2.54	0.96	0.98	1.08	0.38	1.17							
nodosus (holotype)												
1.47	0.92	1.40	1.62	0.60	1.29	0.87	0.77	0.33	0.62	2.87	2.05	1.08
1.72	0.91	0.79	0.91	1.88	2.34	1.09	0.41	0.00	0.69	0.88	1.37	1.95
2.67	1.07	0.88	1.04	0.50	0.81							

nodosus[1]

1.42 0.85 1.35 1.71 0.53 1.41 0.92 0.74 0.33 0.64 2.38 1.53 1.04
1.74 0.90 0.85 0.88 1.61 2.41 1.44 0.35 0.69 0.70 0.70 1.24 2.10
2.30 0.98 0.91 1.02 0.45 0.68

nodosus[2]

1.42 0.87 1.42 1.71 0.51 1.33 0.95 0.89 0.35 0.59 3.17 2.00 1.07
1.59 0.93 0.82 0.91 1.88 2.04 1.08 0.40 0.69 0.69 0.74 1.45 1.89
2.59 1.05 0.88 1.02 0.48 0.94

nodosus[3]

1.38 0.88 1.38 1.72 0.56 1.32 0.91 0.85 0.33 0.56 2.12 1.34 1.04
1.76 0.91 0.84 0.87 2.00 2.72 1.40 0.35 0.69 0.67 0.74 1.21 1.76
2.46 1.10 0.80 1.06 0.48 0.75

nodosus[4]

1.48 0.88 1.40 1.65 0.55 1.32 0.85 0.85 0.34 0.59 2.73 1.84 1.00
1.69 0.93 0.81 0.87 1.69 1.94 1.18 0.34 0.77 0.66 0.71 1.07 1.72
2.26 1.15 0.76 1.03 0.57 0.83

nodosus[5]

1.44 0.95 1.38 1.71 0.55 1.30 0.84 0.80 0.33 0.63 2.63 1.75 0.99
1.76 0.91 0.78 0.90 2.22 2.26 1.39 0.38 0.68 0.63 0.75 1.08 1.84
2.34 1.08 0.88 1.02 0.47 0.69

nodosus[6]

1.47 0.88 1.37 1.57 0.57 1.41 0.90 0.81 0.37 0.55 2.72 1.92 1.18
1.64 0.87 0.79 0.89 1.69 2.16 1.30 0.34 0.74 0.64 0.70 1.32 1.63
2.17 0.94 0.85 1.03 0.39 0.74

nodosus[7]

1.46 0.89 1.35 1.62 0.60 1.33 0.89 0.76 0.34 0.55 2.89 1.96 1.08
1.65 0.85 0.76 0.99 1.34 2.07 1.18 0.35 0.70 0.67 0.81 0.96 1.86
2.64 1.09 0.84 1.04 0.44 0.89

nodosus[8]

1.43 0.89 1.36 1.57 0.61 1.41 0.88 0.76 0.35 0.57 2.50 1.69 1.08
1.72 0.89 0.82 0.89 1.78 2.27 1.36 0.37 0.70 0.74 0.71 1.06 1.98
2.56 1.10 0.86 1.00 0.52 0.68

nodosus[9]

1.46 0.85 1.38 1.64 0.60 1.31 0.97 0.86 0.33 0.70 2.48 1.64 1.07

1.63	0.92	0.80	0.87	1.99	2.06	1.18	0.37	0.63	0.67	0.75	1.28	1.89
2.40	1.09	0.86	1.04	0.51	0.96							
nodosus[10]												
1.45	0.91	1.38	1.64	0.62	1.35	0.96	0.86	0.37	0.68	2.44	1.76	1.06
1.71	0.94	0.79	0.87	1.79	2.25	1.33	0.36	0.70	0.70	0.79	1.08	1.78
2.57	1.05	0.87	1.05	0.44	0.65							
nodosus[11]												
1.52	0.86	1.39	1.55	0.53	1.23	0.96	0.84	0.35	0.63	2.73	2.00	1.11
1.55	0.90	0.80	0.86	2.02	1.70	1.40	0.32	0.63	0.67	0.68	1.14	1.81
2.20	1.06	0.84	0.98	0.45	0.77							
nodosus[12]												
1.40	0.89	1.30	1.61	0.50	1.38	0.88	0.78	0.34	0.78	2.53	1.63	1.01
1.65	0.91	0.78	0.90	1.78	2.07	1.07	0.41	0.63	0.67	0.72	1.33	1.76
2.22	1.05	0.82	1.02	0.42	1.07							
nodosus[13]												
1.50	0.85	1.36	1.57	0.55	1.35	0.89	0.97	0.35	0.69	2.43	1.71	1.05
1.56	0.90	0.74	0.92	1.92	2.36	1.06	0.40	0.65	0.67	0.77	1.31	1.89
2.50	1.07	0.87	0.99	0.51	0.67							
nodosus[14]												
1.44	0.97	1.36	1.68	0.50	1.37	0.99	0.81	0.33	0.66	2.60	1.88	1.00
1.83	0.96	0.82	0.86	2.00	1.63	1.45	0.29	0.74	0.75	0.72	1.35	1.86
2.36	1.05	0.89	1.04	0.44	0.74							
nodosus[15]												
1.44	0.93	1.46	1.60	0.56	1.14	0.96	0.78	0.34	0.60	2.86	1.99	1.07
1.67	0.88	0.78	0.89	1.89	1.79	1.23	0.38	0.68	0.69	0.75	1.42	2.07
2.52	1.19	0.84	1.00	0.45	0.76							
nodosus[16]												
1.42	0.83	1.33	1.64	0.53	1.37	0.88	0.82	0.36	0.59	2.40	1.56	1.05
1.59	0.88	0.80	0.87	2.26	1.88	1.15	0.35	0.69	0.72	0.74	1.18	1.76
2.33	1.03	0.86	0.99	0.48	0.67							
nodosus[17]												
1.56	0.94	1.42	1.56	0.51	1.29	0.85	0.85	0.38	0.61	2.82	2.12	1.04
1.72	0.94	0.80	0.91	2.09	2.46	1.35	0.34	0.66	0.60	0.77	1.32	1.91
2.29	1.11	0.83	1.11	0.45	0.91							

nodosus[18]

1.48	0.92	1.42	1.67	0.69	1.28	1.04	0.99	0.37	0.57	2.53	1.85	1.03
1.65	0.88	0.82	0.87	2.20	2.18	1.40	0.35	0.73	0.68	0.73	1.53	1.83
2.33	1.09	0.86	1.00	0.48	0.64							

nodosus[19]

1.45	0.98	1.40	1.60	0.61	1.30	0.90	0.97	0.35	0.62	2.47	1.58	1.02
1.70	0.91	0.81	0.87	1.95	2.23	1.15	0.37	0.71	0.69	0.74	1.40	1.88
2.36	1.11	0.86	1.03	0.43	0.98							

nonveilleri (holotype)

1.40	0.95	1.54	1.57	0.74	1.32	0.82	1.12	0.37	0.85	2.05	1.38	1.04
1.77	0.91	0.79	0.85	0.30	4.04	1.70	0.48	0.76	0.66	0.73	1.25	2.29
2.55	1.03	0.96	1.07	0.52	1.13							

nonveilleri[1]

1.37	0.98	1.50	1.58	0.74	1.34	0.82	1.11	0.38	0.89	2.00	1.29	0.96
1.74	0.91	0.75	0.87	0.39	4.05	1.72	0.50	0.68	0.75	0.81	1.26	2.43
2.42	0.98	1.04	0.99	0.49	1.08							

nonveilleri[2]

1.39	0.91	1.61	1.55	0.77	1.31	0.80	1.23	0.38	0.89	1.85	1.30	1.00
1.73	0.90	0.80	0.79	0.48	3.80	1.54	0.49	0.71	0.67	0.69	1.02	2.39
2.61	1.03	0.99	0.98	0.50	1.14							

nonveilleri[3]

1.40	0.92	1.54	1.50	0.75	1.36	0.89	1.09	0.39	0.98	2.20	1.48	1.04
1.64	0.91	0.80	0.83	0.36	3.82	1.49	0.49	0.53	0.65	0.67	1.35	2.20
2.47	1.11	0.94	1.02	0.45	1.55							

nursei (paratype)

1.51	1.01	1.56	1.37	0.64	1.36	0.84	1.38	0.33	0.80	2.20	1.45	0.97
1.63	0.88	0.86	0.79	0.64	3.90	1.31	0.64	0.69	0.69	0.83	1.28	2.26
2.79	0.98	0.92	1.09	0.47	1.11							

nursei[1]

1.49	0.95	1.65	1.33	0.72	1.34	0.83	1.36	0.35	0.89	2.08	1.29	1.00
1.63	0.86	0.86	0.81	0.40	3.66	1.30	0.57	0.64	0.69	0.85	1.27	2.25
2.60	0.99	0.92	1.00	0.57	1.51							

nursei[2]

1.42	1.03	1.60	1.46	0.78	1.41	0.82	1.23	0.36	0.85	2.27	1.56	0.94
1.69	0.91	0.85	0.83	0.43	4.29	1.48	0.54	0.65	0.62	0.76	1.33	2.49
2.97	1.00	1.01	1.06	0.46	1.31							

nursei[3]

1.52	1.00	1.62	1.37	0.71	1.37	0.86	1.15	0.36	1.00	1.96	1.30	1.00
1.63	0.90	0.87	0.81	0.43	4.14	1.49	0.54	0.75	0.59	0.92	1.30	2.41
2.89	1.02	0.95	1.05	0.48	1.41							

nursei[4]

1.45	0.95	1.63	1.38	0.76	1.39	0.86	1.20	0.35	0.95	2.20	1.35	0.98
1.65	0.88	0.87	0.82	0.42	3.90	1.39	0.54	0.65	0.65	0.80	1.30	2.35
2.75	1.00	1.00	1.02	0.49	1.35							

palaestinensis (holotype)

1.37	0.88	1.52	1.58	0.72	1.36	0.89	1.06	0.39	0.89	2.00	1.40	1.08
1.69	0.90	0.85	0.83	0.49	3.74	1.37	0.50	0.71	0.63	0.82	0.99	2.40
3.00	1.08	0.85	1.00	0.47	1.20							

palaestinensis (paratype)[1]

1.41	0.95	1.53	1.50	0.76	1.23	0.86	1.30	0.36	0.87	2.25	1.49	1.07
1.74	0.93	0.79	0.82	0.54	3.79	1.58	0.44	0.76	0.63	0.86	1.50	2.73
3.23	1.00	1.03	1.02	0.51	1.18							

pallidicornis (holotype)

1.54	1.01	1.49	1.35	0.60	1.50	0.86	1.62	0.41	0.88	2.59	1.56	0.99
1.59	0.92	0.81	0.77	0.41	3.22	1.45	0.50	0.90	0.58	0.80	1.26	2.11
2.82	0.99	0.95	1.00	0.45	2.00							

pallidicornis[1]

1.47	0.96	1.57	1.40	0.69	1.31	0.82	1.29	0.45	0.92	2.38	1.38	0.94
1.65	0.92	0.80	0.84	0.56	4.06	1.45	0.59	0.81	0.75	0.72	1.32	2.09
2.83	0.98	0.95	1.08	0.39	1.92							

pallidicornis[2]

1.48	0.97	1.55	1.39	0.68	1.35	0.85	1.34	0.38	0.82	2.21	1.18	0.94
1.65	0.90	0.77	0.88	0.44	3.79	1.45	0.53	0.84	0.70	0.81	1.28	2.03
2.76	1.02	0.93	1.07	0.48	1.38							

pallidicornis[3]

1.43	0.98	1.53	1.55	0.66	1.41	0.83	1.22	0.41	0.99	2.47	1.53	1.13
1.63	0.96	0.79	0.83	0.71	3.34	1.18	0.61	0.81	0.69	0.77	1.33	1.98
2.78	1.07	0.87	1.10	0.49	1.69							

pallidicornis[4]

1.52	0.99	1.50	1.37	0.60	1.44	0.96	1.26	0.41	0.81	2.32	1.43	1.05
1.67	0.92	0.83	0.84	0.52	3.75	1.40	0.53	0.75	0.71	0.72	0.84	2.11
2.64	1.05	0.86	1.07	0.45	1.40							

pallidicornis[5]

1.40	1.00	1.47	1.44	0.61	1.47	0.90	1.10	0.41	0.86	2.34	1.46	0.99
1.63	0.92	0.77	0.85	0.39	3.54	1.25	0.80	0.66	0.74	0.78	1.36	2.20
2.78	1.15	0.85	1.01	0.44	1.61							

pallidicornis[6]

1.49	0.94	1.51	1.45	0.67	1.41	0.82	1.20	0.41	0.94	2.26	1.24	0.96
1.64	0.90	0.82	0.84	0.41	3.51	1.47	0.52	0.75	0.70	0.74	1.13	2.28
2.82	1.04	0.95	0.99	0.43	2.00							

pallidicornis[7]

1.52	0.95	1.59	1.40	0.63	1.34	0.83	1.18	0.40	0.99	2.38	1.44	0.96
1.55	0.86	0.82	0.87	0.47	3.78	1.32	0.58	0.72	0.66	0.70	1.22	2.20
2.77	0.98	0.98	0.97	0.48	1.70							

pallidicornis[8]

1.45	0.95	1.47	1.44	0.65	1.41	0.79	1.25	0.41	0.83	2.51	1.50	0.93
1.68	0.94	0.80	0.81	0.41	3.81	1.57	0.50	0.84	0.72	0.88	1.03	2.11
2.59	1.04	0.88	1.06	0.40	1.29							

pallidicornis[9]

1.42	0.91	1.50	1.49	0.70	1.36	0.88	1.28	0.40	0.81	2.41	1.47	1.04
1.61	0.88	0.84	0.89	0.52	3.41	1.21	0.61	0.68	0.71	0.73	1.27	2.09
2.68	0.98	0.99	0.99	0.45	1.53							

pallidicornis[10]

1.51	1.00	1.53	1.35	0.62	1.36	0.84	1.39	0.41	0.97	2.32	1.39	1.06
1.72	0.89	0.82	0.85	0.48	3.60	1.43	0.49	0.72	0.70	0.72	1.12	2.11
2.83	1.00	0.95	1.09	0.37	1.50							

pallidior (holotype)

1.38	0.93	1.50	1.60	0.72	1.36	0.82	1.60	0.40	0.79	2.24	1.67	1.06
1.72	0.95	0.75	0.85	1.16	2.62	1.89	0.26	0.69	0.64	0.60	1.61	2.24
2.53	1.09	0.94	0.99	0.53	0.97							

pallidior[1]

1.42	1.03	1.56	1.62	0.81	1.33	1.03	1.28	0.32	0.89	2.13	1.55	0.98
1.83	0.94	0.73	0.90	1.02	2.17	1.57	0.31	0.66	0.76	0.60	1.39	1.75
1.80	0.85	0.93	1.07	0.46	0.81							

pallidior[2]

1.37	0.90	1.49	1.63	0.79	1.31	0.88	1.31	0.33	0.93	2.14	1.49	1.00
1.70	0.86	0.78	0.89	1.01	2.01	1.67	0.28	0.69	0.68	0.67	1.31	1.59
1.77	0.84	0.84	1.03	0.56	0.80							

pallidior[3]

1.44	0.91	1.52	1.60	0.71	1.32	0.91	1.51	0.34	0.86	2.10	1.68	1.07
1.61	0.90	0.80	0.87	1.05	2.40	1.90	0.25	0.71	0.69	0.69	1.17	1.71
2.51	1.03	0.88	1.06	0.52	0.82							

pallidior[4]

1.62	0.98	1.57	1.48	0.75	1.26	1.04	1.16	0.35	0.96	2.75	1.75	1.00
1.67	0.85	0.77	0.90	1.20	2.19	1.56	0.31	0.66	0.61	0.75	1.35	1.75
2.08	0.98	0.86	0.98	0.51	0.74							

pallidior[5]

1.44	0.93	1.52	1.68	0.75	1.23	1.05	1.32	0.38	1.02	1.95	1.80	1.13
1.54	0.93	0.76	0.84	1.05	2.13	1.75	0.27	0.79	0.72	0.63	1.30	1.35
1.81	0.80	0.86	1.02	0.40	0.83							

pallidior[6]

1.42	0.89	1.59	1.60	0.81	1.27	0.97	1.33	0.35	0.87	2.00	1.53	0.98
1.56	0.88	0.79	0.88	0.96	2.17	1.40	0.30	0.74	0.74	0.60	1.10	1.38
1.73	0.83	0.81	1.04	0.42	1.14							

pallidior[7]

1.48	0.99	1.50	1.51	0.58	1.33	0.92	1.10	0.39	0.90	3.16	2.00	1.18
1.67	0.90	0.80	0.87	0.94	2.56	1.76	0.30	0.72	0.64	0.73	1.30	1.78
2.31	1.16	0.73	1.05	0.54	0.72							

pallidior[8]

1.45	0.92	1.48	1.66	0.69	1.35	0.89	1.27	0.35	0.90	2.11	1.80	1.10

1.58	0.89	0.78	0.88	1.43	2.09	1.63	0.30	0.72	0.70	0.67	1.32	1.78
2.30	1.00	0.85	1.02	0.49	0.81							
pallidior[9]												
1.40	0.93	1.53	1.60	0.75	1.38	0.83	1.50	0.35	0.89	2.04	1.51	1.00
1.64	0.92	0.78	0.87	1.09	2.26	1.91	0.24	0.75	0.70	0.67	0.98	1.74
2.17	1.05	0.82	1.07	0.50	0.83							
pallidior[10]												
1.49	0.91	1.49	1.61	0.66	1.41	0.99	1.32	0.34	0.91	2.04	1.61	1.00
1.49	0.85	0.76	0.88	1.55	2.30	1.75	0.28	0.74	0.71	0.58	1.08	1.50
2.25	1.02	0.75	1.05	0.53	0.76							
pallidior[11]												
1.43	0.88	1.54	1.66	0.77	1.23	0.94	1.27	0.37	0.95	2.13	2.24	1.36
1.72	0.86	0.77	0.94	1.27	2.44	2.10	0.23	0.76	0.81	0.52	1.37	1.56
1.86	0.88	0.84	1.09	0.49	1.08							
pallidior[12]												
1.41	0.92	1.51	1.60	0.76	1.34	1.15	1.24	0.37	0.90	2.11	1.69	1.04
1.70	0.88	0.75	0.89	1.21	2.57	1.59	0.31	0.71	0.66	0.65	1.20	1.60
1.88	0.93	0.78	1.13	0.49	0.88							
pallidior[13]												
1.45	0.88	1.46	1.64	0.67	1.42	0.95	1.39	0.34	1.00	1.90	1.60	1.00
1.48	0.89	0.75	0.85	1.35	2.15	1.67	0.29	0.73	0.74	0.69	1.27	1.67
2.20	1.05	0.78	0.99	0.53	0.82							
pallidior[14]												
1.47	0.96	1.64	1.56	0.76	1.32	1.12	1.34	0.33	0.84	2.30	1.86	1.07
1.61	0.91	0.76	0.89	0.99	2.17	1.77	0.29	0.74	0.73	0.64	1.26	1.85
2.40	1.08	0.81	1.04	0.51	0.66							
pallidior[15]												
1.43	0.99	1.52	1.60	0.73	1.37	0.97	1.08	0.35	0.84	2.21	1.74	1.14
1.76	0.93	0.74	0.91	0.98	2.22	1.48	0.32	0.82	0.65	0.63	1.29	1.76
2.25	1.08	0.83	1.04	0.50	0.82							
pallidior[16]												
1.48	0.87	1.58	1.54	0.78	1.25	0.97	1.26	0.34	0.87	2.10	1.74	1.05
1.53	0.89	0.76	0.89	1.18	2.52	1.62	0.29	0.75	0.76	0.63	1.11	1.43
2.18	0.97	0.74	1.17	0.41	0.69							

pallidior[17]

1.42	0.98	1.51	1.60	0.76	1.37	0.98	1.53	0.32	0.86	2.21	1.83	1.10
1.75	0.91	0.76	0.89	0.93	2.19	1.44	0.33	0.76	0.68	0.58	1.25	1.88
2.16	1.02	0.87	1.04	0.46	0.82							

pallidior[18]

1.41	0.89	1.43	1.72	0.69	1.45	0.93	1.22	0.34	0.85	2.39	1.67	1.01
1.60	0.89	0.75	0.92	1.18	1.96	1.37	0.37	0.74	0.71	0.63	1.06	1.73
2.20	1.04	0.79	1.05	0.45	0.78							

pallidus (holotype)

1.55	0.93	1.56	1.34	0.61	1.33	0.87	0.97	0.40	0.83	1.98	1.45	1.06
1.55	0.94	0.82	0.82	0.37	3.93	1.20	0.59	0.74	0.75	0.63	1.20	1.70
2.07	1.06	0.80	1.06	0.64	1.36							

pallidus

1.53	0.96	1.52	1.35	0.61	1.35	0.73	1.25	0.41	0.84	2.08	1.49	1.11
1.53	0.92	0.79	0.85	0.54	4.39	1.32	0.58	0.68	0.75	0.75	1.09	2.42
2.93	1.08	0.92	1.02	0.47	1.32							

parallelus (holotype)

1.41	1.02	1.55	1.46	0.72	1.40	0.90	1.29	0.37	0.82	2.15	1.46	1.00
1.62	0.91	0.73	0.85	0.36	4.44	1.33	0.68	0.71	0.63	0.81	1.41	2.30
2.74	1.17	0.86	1.03	0.53	1.65							

parallelus (paratype)

1.29	0.97	1.51	1.62	0.74	1.38	0.81	1.10	0.36	0.82	1.95	1.40	1.06
1.69	0.91	0.75	0.84	0.47	4.42	1.74	0.46	0.70	0.57	0.92	1.40	2.42
2.65	1.03	0.96	1.03	0.54	1.52							

parallelus (paratype)

1.39	1.06	1.54	1.53	0.70	1.44	0.81	1.44	0.37	0.91	1.74	1.20	0.98
1.69	0.96	0.73	0.83	0.46	4.12	1.60	0.45	0.71	0.60	0.78	1.11	2.37
2.70	1.03	0.95	1.12	0.44	1.12							

parallelus (paratype)

1.42	1.00	1.57	1.47	0.69	1.37	0.92	1.21	0.37	0.89	1.80	1.24	0.98
1.61	0.93	0.82	0.79	0.45	4.73	1.37	0.55	0.73	0.59	0.78	1.29	2.30
2.77	0.98	1.00	1.02	0.48	1.49							

paulocellatus (holotype)

1.37	0.86	1.32	1.86	0.65	1.27	0.88	0.90	0.41	1.07	1.91	1.38	1.02
1.69	0.86	0.78	0.90	0.74	2.99	1.58	0.40	0.71	0.62	0.82	1.26	2.28
2.74	1.04	1.00	0.98	0.50	1.31							

paulocellatus (paratype)[1]

1.49	0.93	1.39	1.62	0.58	1.36	0.88	1.13	0.41	0.96	1.78	1.48	1.10
1.76	0.89	0.76	0.91	0.71	3.31	1.58	0.41	0.83	0.81	0.74	1.35	2.40
2.80	1.13	0.97	1.02	0.50	1.42							

paulocellatus (paratype)[2]

1.47	0.93	1.41	1.56	0.59	1.36	0.86	1.19	0.43	1.14	1.74	1.37	1.01
1.69	0.93	0.79	0.87	0.96	3.24	1.72	0.39	0.73	0.67	0.81	1.09	2.60
2.79	1.05	1.08	1.00	0.50	1.46							

paulocellatus (paratype)[3]

1.47	0.91	1.33	1.71	0.68	1.40	0.77	0.85	0.41	0.94	1.88	1.38	0.94
1.72	0.85	0.74	0.96	0.72	3.17	1.58	0.43	0.69	0.64	0.81	1.25	2.44
2.87	0.98	0.97	1.04	0.42	1.67							

pedunculatoides (holotype)

1.39	0.92	1.47	1.50	0.68	1.42	0.86	1.31	0.41	0.82	1.85	1.32	1.08
1.61	0.91	0.77	0.80	0.47	4.42	1.57	0.48	0.70	0.51	0.81	1.39	2.43
2.95	1.04	0.98	1.02	0.50	1.21							

pedunculatoides (paratype)[1]

1.46	0.92	1.53	1.37	0.68	1.35	0.83	1.25	0.41	0.80	2.03	1.45	0.99
1.59	0.90	0.79	0.81	0.43	4.19	1.45	0.53	0.77	0.57	0.81	1.34	2.39
2.87	1.01	1.00	1.01	0.52	1.42							

pedunculatoides (paratype)[2]

1.42	1.03	1.54	1.45	0.73	1.38	0.87	1.25	0.38	0.78	2.31	1.47	1.04
1.71	0.90	0.77	0.81	0.51	4.26	1.59	0.52	0.79	0.72	0.83	1.46	2.55
2.62	0.96	1.07	1.02	0.45	1.16							

pedunculatoides (paratype)[3]

1.34	1.00	1.52	1.55	0.75	1.38	0.83	1.08	0.37	0.80	2.39	1.50	0.96
1.70	0.91	0.76	0.85	0.53	4.32	1.37	0.56	0.79	0.72	0.71	1.44	2.50
2.83	1.06	1.01	1.04	0.49	1.43							

pedunculatoides (paratype)[4]

1.35	0.94	1.53	1.49	0.78	1.37	0.93	1.14	0.39	0.78	2.21	1.46	0.93
1.61	0.88	0.73	0.85	0.50	4.30	1.54	0.47	0.71	0.57	0.84	1.39	2.46
2.80	1.08	0.95	1.01	0.49	1.58							

pedunculatoides (paratype)[5]

1.40	0.98	1.55	1.37	0.73	1.38	0.86	1.22	0.36	0.89	2.02	1.48	0.99
1.64	0.87	0.79	0.80	0.44	4.35	1.58	0.51	0.74	0.70	0.84	1.16	2.41
2.88	0.99	0.89	0.95	0.51	1.36							

pedunculatoides[1]

1.42	0.91	1.58	1.54	0.73	1.34	0.85	1.18	0.35	0.98	2.00	1.40	1.00
1.47	0.85	0.82	0.79	0.43	4.65	1.52	0.51	0.69	0.54	0.80	1.29	2.05
2.73	0.98	0.86	1.08	0.47	0.82							

pedunculatoides[2]

1.43	0.97	1.54	1.46	0.63	1.34	0.75	1.36	0.41	0.91	2.12	1.37	1.00
1.62	0.87	0.79	0.81	0.44	4.76	1.53	0.53	0.72	0.61	0.79	1.27	2.41
2.83	1.08	0.87	1.06	0.47	1.86							

pedunculatoides[3]

1.36	0.93	1.59	1.54	0.78	1.37	0.91	1.39	0.39	0.86	1.94	1.42	1.06
1.51	0.88	0.77	0.80	0.47	4.88	1.72	0.48	0.65	0.56	0.82	1.35	2.62
2.85	0.98	1.05	0.97	0.45	1.26							

pedunculatoides[4]

1.31	0.90	1.50	1.54	0.75	1.50	0.86	1.22	0.37	0.98	1.90	1.31	1.06
1.54	0.88	0.80	0.80	0.37	4.73	1.61	0.48	0.64	0.52	0.83	1.16	2.10
2.72	1.00	0.91	1.08	0.44	1.63							

pedunculatoides[5]

1.48	0.96	1.52	1.39	0.64	1.36	0.79	1.27	0.41	0.84	2.10	1.45	1.00
1.65	0.88	0.79	0.81	0.36	4.75	1.66	0.48	0.74	0.58	0.84	1.38	2.38
2.88	1.03	0.95	1.00	0.50	1.19							

pedunculatoides[6]

1.41	0.95	1.58	1.53	0.78	1.38	0.83	1.48	0.35	0.88	2.16	1.48	1.03
1.54	0.89	0.73	0.83	0.45	4.24	1.41	0.54	0.61	0.51	0.76	1.23	2.30
2.68	1.07	0.88	1.06	0.52	1.48							

pedunculatoides[7]

1.38	0.97	1.53	1.49	0.81	1.37	0.85	1.22	0.36	0.90	1.90	1.35	1.06

1.60	0.89	0.79	0.82	0.44	4.56	1.70	0.47	0.69	0.54	0.74	1.32	2.19
2.59	1.05	0.88	1.02	0.51	1.34							
pedunculatoides[8]												
1.37	0.92	1.53	1.54	0.78	1.34	0.82	1.38	0.38	0.83	2.08	1.50	1.04
1.53	0.88	0.70	0.89	0.35	4.32	1.55	0.51	0.68	0.55	0.77	1.28	2.36
2.79	1.06	0.89	1.03	0.53	1.37							
pedunculatoides[9]												
1.44	0.96	1.59	1.41	0.67	1.37	0.86	1.45	0.38	0.83	1.87	1.30	1.07
1.55	0.88	0.76	0.81	0.43	3.59	1.44	0.52	0.69	0.59	7.53	1.27	2.29
2.70	1.02	0.94	0.95	0.44	1.43							
pedunculatus (paralectotype)[1]												
1.46	0.98	1.50	1.49	0.60	1.34	0.90	1.26	0.38	0.79	2.17	1.46	1.06
1.63	0.89	0.77	0.83	0.39	4.84	1.97	0.38	0.74	0.68	0.86	1.37	2.28
2.69	0.96	0.99	1.04	0.48	1.35							
pedunculatus (paralectotype)[2]												
1.42	0.94	1.52	1.55	0.68	1.27	0.81	1.35	0.38	1.00	1.90	1.47	1.04
1.75	0.93	0.82	0.79	0.62	3.85	1.47	0.48	0.78	0.67	0.81	1.29	2.40
2.87	0.91	1.01	1.11	0.44	1.25							
pedunculatus												
1.40	1.05	1.52	1.48	0.68	1.34	0.83	1.23	0.37	0.78	2.31	1.57	1.03
1.76	0.96	0.82	0.81	0.50	4.89	1.59	0.51	0.79	0.68	0.80	1.35	2.41
3.03	1.03	0.92	1.10	0.51	1.14							
petiolatus (holotype)												
1.41	0.91	1.48	1.67	0.76	1.34	0.88	1.38	0.38	0.98	2.02	1.67	1.06
1.72	0.90	0.81	0.90	2.04	2.79	1.71	0.29	0.75	0.69	0.63	1.71	2.04
2.65	0.90	0.94	0.99	0.51	0.71							
petiolatus (paratype)[1]												
1.44	1.01	1.47	1.53	0.70	1.33	0.80	1.39	0.47	0.89	2.09	1.90	1.09
1.79	0.90	0.76	0.91	1.39	2.68	2.22	0.27	0.75	0.70	0.60	1.66	2.11
2.62	1.01	0.93	1.03	0.55	0.95							
petiolatus (paratype)[2]												
1.50	0.93	1.45	1.56	0.60	1.47	0.76	1.14	0.37	0.92	2.12	1.70	1.02

1.83	0.93	0.89	0.89	1.78	2.38	1.40	0.39	0.66	0.72	0.61	1.59	1.92
2.71	0.89	0.96	0.94	0.47	0.86							
petiolatus (paratype)[3]												
1.41	1.01	1.48	1.55	0.66	1.40	0.79	1.52	0.40	0.95	2.07	1.61	1.00
1.90	0.87	0.82	0.90	1.76	2.30	1.70	0.30	0.71	0.71	0.64	1.14	2.09
2.30	0.94	0.93	1.05	0.54	0.59							
petiolatus (paratype)[4]												
1.47	0.85	1.66	1.65	0.69	1.29	0.69	1.73	0.43	0.95	1.86	1.63	1.02
1.65	0.93	0.82	0.86	1.61	2.57	1.54	0.35	0.74	0.72	0.62	1.52	2.05
2.75	1.03	0.92	0.96	0.62	0.67							
petiolatus (paratype)[5]												
1.44	0.85	1.52	1.61	0.69	1.29	0.84	1.41	0.37	0.91	1.82	1.52	1.03
1.57	0.93	0.81	0.91	1.77	2.55	1.70	0.30	0.73	0.70	0.65	1.12	1.95
2.46	0.96	0.85	1.03	0.63	0.62							
petiolatus (paratype)[6]												
1.46	0.88	1.52	1.70	0.71	1.41	0.87	1.40	0.37	0.95	2.28	1.75	0.97
1.77	0.90	0.84	0.86	1.81	2.40	1.88	0.28	0.71	0.70	0.65	1.51	1.98
2.77	1.05	0.84	0.99	0.54	0.78							
petiolatus (paratype)[7]												
1.47	0.94	1.59	1.58	0.71	1.51	0.89	1.39	0.43	1.00	2.26	1.75	1.05
1.69	0.89	0.79	0.88	1.62	2.54	1.65	0.31	0.76	0.75	0.63	1.32	1.99
2.43	0.95	0.94	1.03	0.54	0.75							
protuberans (holotype)												
1.44	0.98	1.64	1.47	0.76	1.22	0.99	1.14	0.35	0.86	2.13	1.42	1.06
1.64	0.91	0.76	0.85	0.30	4.43	1.46	0.50	0.69	0.56	0.81	1.20	2.13
2.77	0.96	0.94	1.07	0.46	1.57							
protuberans (paratype)[1]												
1.48	1.05	1.59	1.39	0.67	1.29	0.86	0.99	0.34	0.96	2.17	1.50	1.03
1.68	0.94	0.79	0.82	0.30	3.58	1.47	0.51	0.69	0.56	0.77	1.21	2.11
2.60	0.93	0.93	1.10	0.47	1.27							
protuberans (paratype)[2]												
1.43	1.09	1.54	1.43	0.67	1.29	0.93	0.74	0.38	0.92	2.32	1.50	1.01
1.75	0.94	0.78	0.79	0.33	4.49	1.67	0.50	0.73	0.63	0.78	1.25	2.22

2.90	0.89	0.98	1.14	0.47	1.30							
protuberans (paratype)[3]												
1.42	1.07	1.63	1.46	0.72	1.30	0.90	0.97	0.34	0.81	2.12	1.37	1.01
1.74	0.91	0.81	0.82	0.35	4.35	1.49	0.51	0.68	0.60	0.78	1.35	2.22
2.54	0.96	0.95	1.09	0.43	1.44							
protuberans (paratype)[4]												
1.43	1.02	1.56	1.49	0.73	1.29	0.88	1.22	0.38	0.92	2.06	1.32	1.09
1.64	0.92	0.85	0.79	0.27	4.28	1.57	0.47	0.58	0.56	0.76	1.30	2.26
2.83	0.93	0.97	1.09	0.44	0.93							
recurvatus (holotype)												
1.46	0.94	1.46	1.38	0.65	1.38	0.77	1.79	0.36	0.91	2.31	1.61	1.04
1.61	0.92	0.84	0.84	0.35	4.38	1.46	0.49	0.84	0.77	0.70	0.89	2.06
2.81	0.89	0.95	1.01	0.46	1.36							
saharicus (holotype)												
1.56	1.00	1.49	1.31	0.55	1.41	0.77	1.52	0.40	0.92	1.92	1.37	1.05
1.61	0.94	0.77	0.82	0.53	3.75	1.34	0.53	0.66	0.67	0.69	1.11	2.18
2.51	1.04	0.88	1.08	0.49	1.59							
saharicus (paratype)[1]												
1.49	1.00	1.58	1.34	0.66	1.40	0.88	1.08	0.39	0.92	1.95	1.40	1.06
1.76	0.90	0.81	0.84	0.48	3.49	1.18	0.64	0.64	0.65	0.76	0.92	2.35
2.54	1.05	0.92	1.13	0.44	1.59							
saharicus (paratype)[2]												
1.55	0.94	1.54	1.32	0.60	1.39	0.92	1.35	0.36	0.88	2.23	1.53	1.03
1.68	0.91	0.80	0.81	0.50	3.20	1.26	0.59	0.76	0.70	0.68	0.91	2.47
2.74	1.08	0.96	1.05	0.43	1.45							
saharicus (paratype)[3]												
1.53	1.02	1.56	1.38	0.65	1.37	0.89	1.36	0.35	0.82	2.00	1.50	1.00
1.67	0.89	0.82	0.84	0.37	3.72	1.25	0.59	0.68	0.65	0.80	1.05	2.23
2.42	1.01	0.91	1.05	0.43	1.41							
saharicus (paratype)[4]												
1.48	0.97	1.53	1.41	0.66	1.37	0.81	1.44	0.39	0.87	2.02	1.37	0.97
1.67	0.90	0.85	0.82	0.46	3.81	1.33	0.59	0.75	0.68	0.70	1.01	2.41

2.56	1.00	0.97	1.08	0.46	1.64							
saharicus (paratype)[5]												
1.52	0.92	1.48	1.37	0.55	1.28	0.79	1.25	0.38	0.92	1.92	1.50	1.15
1.64	0.40	0.81	1.90	0.38	4.32	1.29	0.60	0.77	0.70	0.76	1.00	2.33
2.76	0.98	0.99	1.01	0.43	1.47							
saharicus (paratype)[6]												
1.42	0.91	1.57	1.43	0.74	1.33	0.84	1.23	0.39	0.93	2.08	1.56	1.02
1.62	0.91	0.85	0.83	0.40	3.71	1.33	0.52	0.78	0.67	0.77	1.10	2.22
2.68	1.03	0.93	1.08	0.45	1.47							
saharicus (paratype)[7]												
1.59	0.97	1.47	1.27	0.57	1.39	0.92	1.62	0.40	0.88	1.77	1.27	1.02
1.66	0.91	0.79	0.83	0.55	3.89	1.40	0.53	0.80	0.67	0.73	1.11	2.37
2.73	1.03	0.92	1.07	0.46	1.44							
saharicus (paratype)[8]												
1.57	0.91	1.49	1.41	0.58	1.46	0.82	1.31	0.41	0.92	1.92	1.32	0.98
1.50	0.90	0.80	0.82	0.45	4.13	1.39	0.52	0.75	0.66	0.72	1.03	2.14
2.76	0.96	0.94	1.01	0.40	1.52							
saharicus (paratype)[9]												
1.49	1.09	1.50	1.32	0.61	1.51	0.86	1.23	0.34	0.81	2.14	1.47	1.11
1.70	0.91	0.76	0.83	0.57	3.50	1.33	0.52	0.73	0.67	0.74	0.93	2.42
2.44	1.13	0.88	1.08	0.52	1.46							
saharicus (paratype)[10]												
1.53	0.96	1.49	1.37	0.63	1.42	0.93	0.95	0.30	0.92	1.83	1.30	1.09
1.61	0.92	0.77	0.85	0.49	3.95	1.50	0.47	0.68	0.65	0.75	0.94	2.08
2.52	1.05	0.88	1.15	0.45	1.74							
saharicus (paratype)[11]												
1.47	0.98	1.50	1.39	0.66	1.32	0.88	1.28	0.36	0.88	2.00	1.31	0.99
1.65	0.97	0.75	0.84	0.54	3.83	1.29	0.58	0.68	0.64	0.74	1.23	2.49
2.66	0.98	1.00	1.04	0.45	1.52							
saharicus[1]												
1.43	0.94	1.47	1.47	0.60	1.39	0.83	1.15	0.39	0.97	1.81	1.43	1.07
1.62	0.91	0.81	0.83	0.45	3.69	1.40	0.55	0.77	0.69	0.75	1.09	2.13
2.43	1.01	0.88	1.03	0.44	1.57							

saharicus[2]

1.51	0.97	1.56	1.41	0.65	1.32	0.95	1.07	0.42	0.79	1.91	1.39	1.00
1.57	0.88	0.77	0.85	0.32	4.25	1.39	0.55	0.77	0.68	0.77	1.05	2.43
2.80	1.03	0.95	1.00	0.41	1.98							

saharicus[3]

1.42	0.91	1.48	1.41	0.74	1.40	0.87	1.23	0.40	0.81	1.95	1.42	1.02
1.68	0.93	0.78	0.81	0.53	4.16	1.27	0.59	0.88	0.75	0.71	1.27	2.09
2.60	0.92	1.01	1.06	0.46	2.07							

saharicus[4]

1.46	0.95	1.53	1.35	0.68	1.36	0.85	1.21	0.39	0.90	1.84	1.30	0.92
1.55	0.92	0.80	0.82	0.40	4.31	1.40	0.55	0.75	0.70	0.71	1.24	2.09
2.67	1.04	0.91	1.02	0.42	1.74							

scorteccii (holotype)

1.42	1.03	1.52	1.45	0.60	1.20	0.80	0.91	0.42	0.81	2.00	1.32	1.00
1.72	0.90	0.74	0.85	0.49	4.50	1.45	0.50	0.74	0.68	0.81	1.31	2.55
2.70	1.03	1.06	1.04	0.45	1.22							

scorteccii (paratype)[1]

1.44	1.05	1.53	1.46	0.58	1.18	0.79	0.90	0.42	0.83	1.96	1.30	0.99
1.76	0.93	0.74	0.85	0.43	2.95	1.46	0.49	0.75	0.69	0.86	1.39	2.65
2.79	1.00	1.08	1.04	0.41	1.29							

signatipennis (holotype)

1.51	0.95	1.46	1.68	0.62	1.29	0.81	1.61	0.43	0.94	1.48	1.32	1.01
1.76	0.91	0.81	0.87	0.99	3.39	1.56	0.44	0.68	0.62	0.78	1.52	2.62
2.96	1.29	0.87	0.98	0.54	1.76							

signatipennis[1]

1.51	0.92	1.58	1.67	0.68	1.20	0.83	1.42	0.36	0.91	1.58	1.36	1.10
1.79	0.84	0.78	0.85	0.81	3.46	1.66	0.33	0.73	0.67	0.76	1.52	2.91
2.98	1.08	1.04	0.93	0.57	1.07							

signatipennis[2]

1.52	0.99	1.51	1.64	0.63	1.25	0.61	1.42	0.36	0.99	1.55	1.37	1.07
1.87	0.90	0.73	0.90	0.79	3.25	1.59	0.35	0.77	0.75	0.71	1.47	2.88
2.80	1.09	1.06	0.99	0.57	1.18							

signatipennis[3]

1.60 0.97 1.60 1.64 0.60 1.35 0.81 1.31 0.35 0.95 1.54 1.39 1.02
1.73 0.90 0.72 0.89 0.86 2.92 1.27 0.47 0.80 0.66 0.80 1.49 2.57
2.70 1.16 0.95 0.91 0.56 1.02

signatipennis[4]

1.60 0.94 1.51 1.48 0.64 1.24 0.86 1.82 0.42 0.83 1.56 1.36 1.00
1.72 0.91 0.80 0.89 0.85 2.83 1.32 0.48 0.69 0.67 0.75 1.22 2.37
2.73 1.16 0.93 0.99 0.54 1.15

signatipennis[5]

1.52 0.88 1.47 1.70 0.60 1.22 0.87 1.36 0.41 1.06 1.90 1.80 1.15
1.72 0.89 0.70 0.89 0.79 3.47 1.42 0.45 0.70 0.66 0.84 1.55 2.56
2.80 1.16 0.95 0.94 0.60 0.94

signatipennis[6]

1.44 0.96 1.51 1.63 0.67 1.26 0.86 1.15 0.46 0.98 1.60 1.34 1.04
1.70 0.88 0.70 0.88 0.97 3.65 1.62 0.39 0.70 0.66 0.87 1.61 2.66
2.92 1.08 1.05 0.97 0.60 1.05

signatipennis[7]

1.56 0.92 1.49 1.58 0.63 1.12 0.80 1.60 0.42 1.16 1.55 1.26 0.97
1.69 0.91 0.80 0.88 0.80 3.39 1.49 0.46 0.73 0.67 0.76 1.35 2.41
2.63 1.01 1.01 0.95 0.49 0.92

signatipennis[8]

1.52 0.90 1.46 1.64 0.68 1.25 0.81 1.10 0.39 0.94 1.37 1.17 1.00
1.73 0.94 0.76 0.86 0.81 3.62 1.59 0.39 0.74 0.63 0.87 1.50 2.74
3.15 1.08 1.08 0.96 0.57 1.10

signatipennis[9]

1.44 0.88 1.52 1.65 0.75 1.20 0.75 1.38 0.37 0.86 1.64 1.37 1.00
1.76 0.87 0.73 0.89 0.68 3.26 1.64 0.39 0.75 0.71 0.83 1.42 2.71
3.00 1.07 1.02 0.97 0.58 0.87

signatipennis[10]

1.36 0.90 1.47 1.80 0.71 1.21 0.63 1.55 0.39 0.85 1.45 1.27 1.06
1.75 0.91 0.72 0.88 0.80 3.88 1.53 0.43 0.72 0.71 0.76 1.60 2.74
3.17 1.13 0.98 0.95 0.64 0.92

signatipennis[11]

1.47 0.95 1.50 1.59 0.71 1.36 0.88 1.69 0.37 0.92 1.73 1.40 1.00

1.87	0.92	0.78	0.90	0.85	2.98	1.48	0.49	0.70	0.68	0.82	1.37	2.64
3.01	1.10	0.98	1.00	0.53	1.02							
signatipennis[12]												
1.56	1.00	1.49	1.52	0.61	1.42	0.87	1.56	0.41	0.92	1.78	1.45	0.97
1.82	0.93	0.80	0.90	0.91	2.76	1.32	0.46	0.69	0.80	0.67	1.46	2.52
2.82	1.07	0.98	1.00	0.52	0.69							
signatipennis[13]												
1.64	0.89	1.58	1.43	0.77	1.27	1.04	1.81	0.47	0.91	1.60	1.37	1.04
1.65	0.82	0.75	0.94	0.71	3.33	1.51	0.46	0.71	0.66	0.70	1.43	1.91
2.11	0.96	0.88	0.93	0.54	1.08							
signatipennis[14]												
1.38	0.92	1.46	1.67	0.72	1.26	0.85	2.08	0.40	0.91	1.62	1.35	1.10
1.76	0.91	0.78	0.88	0.85	2.84	1.36	0.47	0.69	0.60	0.76	1.17	2.55
2.88	1.11	0.95	0.99	0.57	1.31							
signatipennis[15]												
1.53	0.99	1.55	1.47	0.64	1.17	0.83	1.63	0.40	0.92	1.95	1.52	1.01
1.68	0.92	0.73	0.89	0.80	3.27	1.68	0.43	0.75	0.69	0.75	1.38	2.54
2.79	1.06	0.95	1.00	0.47	1.16							
signatipennis[16]												
1.48	0.91	1.52	1.50	0.66	1.28	0.86	1.79	0.43	0.93	1.86	1.40	1.06
1.71	0.90	0.78	0.87	0.79	3.28	1.29	0.53	0.71	0.65	0.75	1.13	2.56
2.78	1.08	1.00	0.99	0.54	1.28							
signatipennis[17]												
1.49	0.83	1.45	1.58	0.77	1.21	0.90	1.40	0.37	0.91	1.45	1.36	1.08
1.64	0.84	0.80	0.91	0.74	2.80	1.41	0.43	0.67	0.61	0.75	1.21	1.88
2.19	0.80	0.97	1.00	0.43	1.40							
signatipennis[18]												
1.67	0.84	1.64	1.47	0.77	1.19	1.04	1.21	0.41	0.98	1.51	1.40	1.05
1.49	0.78	0.74	0.94	0.68	3.15	1.41	0.47	0.74	0.64	0.81	1.30	1.90
2.44	0.96	0.93	0.93	0.47	1.11							
sinuatus (holotype)												
1.47	0.92	1.57	1.47	0.71	1.30	0.87	1.07	0.37	0.85	2.22	1.41	1.04
1.50	0.88	0.77	0.84	0.43	4.01	1.59	0.51	0.67	0.47	0.95	1.15	1.92

2.47	1.01	0.84	1.07	0.53	1.25							
sinuatus (paratype)												
1.34	0.98	1.54	1.54	0.75	1.34	0.91	1.28	0.35	0.80	2.24	1.32	0.93
1.61	0.90	0.77	0.85	0.57	3.98	1.71	0.43	0.71	0.55	0.86	1.21	2.36
2.91	0.97	1.00	1.04	0.51	1.27							
sinuatus (paratype)												
1.36	0.99	1.51	1.56	0.76	1.40	0.84	1.15	0.36	0.83	2.25	1.40	1.04
1.64	0.91	0.80	0.83	0.41	4.25	1.41	0.51	0.71	0.52	0.89	1.17	2.44
3.26	1.01	0.99	1.04	0.47	1.82							
stigmaticus (holotype)												
1.44	0.92	1.56	1.47	0.74	1.30	0.80	1.71	0.41	0.96	1.61	1.22	1.01
1.68	0.97	0.74	0.83	0.95	3.16	1.45	0.48	0.73	0.63	0.70	1.49	2.51
2.94	1.17	0.97	0.94	0.57	1.08							
semistriataeformis (holotype)												
1.51	0.87	1.48	1.23	0.65	1.24	0.81	1.79	0.41	0.91	1.63	1.30	0.98
1.68	0.90	0.81	0.87	0.88	3.20	1.41	0.50	0.72	0.64	0.72	1.45	2.51
2.81	1.17	0.92	0.92	0.51	1.00							
stigmaticus[1]												
1.44	0.88	1.49	1.73	0.74	1.27	0.92	1.25	0.38	0.96	1.68	1.36	0.97
1.69	0.88	0.78	0.91	1.03	3.14	1.57	0.48	0.64	0.62	0.69	1.53	2.22
2.49	0.85	1.07	0.95	0.53	1.14							
stigmaticus[2]												
1.44	0.84	1.44	1.73	0.72	1.09	1.00	1.33	0.38	1.06	1.65	1.29	1.01
1.61	0.84	0.82	0.90	0.75	2.96	1.24	0.52	0.74	0.66	0.75	1.43	2.29
2.43	0.88	1.09	0.87	0.51	1.18							
stigmaticus[3]												
1.45	0.82	1.42	1.63	0.62	1.20	0.86	1.35	0.43	0.99	1.65	1.39	0.98
1.54	0.87	0.75	0.85	0.88	3.47	1.75	0.38	0.77	0.66	0.76	1.49	2.23
2.36	0.94	0.94	0.89	0.65	1.00							
stigmaticus[4]												
1.44	0.79	1.47	1.62	0.59	1.16	1.04	1.12	0.46	1.02	1.48	1.43	0.98
1.57	0.82	0.78	0.86	0.88	3.28	1.63	0.42	0.69	0.67	0.75	1.52	2.14
2.38	0.85	1.05	0.90	0.50	1.18							

stigmaticus[5]

1.42	0.92	1.52	1.70	0.70	1.21	0.93	1.57	0.42	0.99	1.46	1.27	1.03
1.69	0.91	0.73	0.89	0.77	3.72	1.55	0.41	0.68	0.68	0.89	1.56	2.38
2.61	0.98	0.96	0.98	0.64	1.35							

stigmaticus[6]

1.44	0.91	1.45	1.64	0.71	1.36	0.94	1.36	0.43	0.91	1.48	1.36	1.07
1.80	0.91	0.77	0.93	0.63	3.12	1.43	0.50	0.75	0.67	0.83	1.34	2.25
2.40	0.92	1.02	0.96	0.46	1.08							

stigmaticus[7]

1.36	1.08	1.51	1.90	0.77	1.42	1.03	1.05	0.35	1.01	1.66	1.41	1.00
2.09	1.10	0.77	0.85	0.71	3.88	1.54	0.41	0.78	0.70	0.79	1.27	2.08
2.31	0.98	1.02	1.08	0.62	1.14							

stigmaticus[8]

1.38	0.88	1.46	1.76	0.74	1.26	0.91	0.86	4.50	0.95	1.65	1.36	1.00
1.76	0.88	0.78	0.88	0.81	3.25	1.57	0.46	0.76	0.71	0.76	1.35	2.12
2.35	0.96	0.97	1.02	0.58	1.17							

sudanensis (paratype)[1]

1.47	1.07	1.61	1.48	0.67	1.33	0.98	1.28	0.36	0.79	2.19	1.42	1.04
1.74	0.90	0.84	0.79	0.33	4.63	1.56	0.54	0.80	0.65	0.79	1.37	2.24
2.84	0.95	1.03	1.03	0.45	1.31							

sudanensis (paratype)[2]

1.47	0.99	1.55	1.43	0.64	1.36	0.88	1.13	0.34	0.80	2.11	1.50	1.02
1.61	0.87	0.80	0.86	0.45	4.28	1.28	0.62	0.79	0.75	0.72	1.28	2.37
2.60	0.95	1.00	1.05	0.50	1.40							

sudanensis (paratype)[3]

1.44	1.01	1.59	1.51	0.78	1.40	0.79	1.07	0.36	0.92	2.18	1.24	1.00
1.61	0.84	0.76	0.89	0.44	4.24	1.55	0.49	0.72	0.64	0.83	1.29	2.27
3.12	1.00	0.96	1.08	0.48	1.10							

sudanensis (paratype)[4]

1.46	0.99	1.59	1.44	0.71	1.35	0.79	1.12	0.36	0.81	2.27	1.46	1.03
1.59	0.93	0.77	0.84	0.42	4.26	1.65	0.46	0.63	0.65	0.87	1.42	2.37
2.93	1.09	0.92	1.02	0.55	1.64							

sudanensis (paratype)[5]

1.37	0.98	1.51	1.56	0.74	1.40	0.85	1.00	0.38	0.83	2.15	1.33	0.99
1.60	0.90	0.79	0.80	0.47	4.47	1.43	0.51	0.77	0.75	0.78	1.26	2.14
2.61	1.05	0.92	1.04	0.50	1.06							

sudanensis[1]

1.47	0.98	1.64	1.49	0.71	1.22	0.89	1.09	0.38	0.83	2.21	1.43	1.00
1.55	0.92	0.78	0.78	0.37	4.36	1.96	0.40	0.71	0.64	0.76	1.30	2.15
2.55	1.00	0.91	1.08	0.50	1.68							

sudanensis[2]

1.45	1.05	1.61	1.51	0.75	1.29	0.82	1.22	0.39	0.85	2.34	1.56	1.00
1.82	0.95	0.80	0.78	0.36	4.19	1.63	0.50	0.72	0.69	1.10	1.35	2.34
2.74	1.01	0.96	1.10	0.43	1.39							

sudanensis[3]

1.41	1.12	1.48	1.46	0.69	1.42	0.91	1.37	0.36	0.76	2.20	1.48	1.01
1.65	0.90	0.80	0.84	0.50	4.09	1.46	0.56	0.73	0.62	0.89	1.48	2.25
2.52	1.05	0.91	1.07	0.49	1.32							

sudanensis[4]

1.50	0.89	1.53	1.46	0.71	1.46	0.89	1.26	0.37	1.20	2.37	1.46	1.07
1.54	0.89	0.84	0.86	0.29	4.02	1.47	0.49	0.73	0.63	0.79	1.11	2.10
2.83	0.86	0.95	1.03	0.48	1.28							

sudanensis[5]

1.58	0.88	1.58	1.36	0.73	1.41	0.76	1.36	0.34	0.98	2.09	1.35	0.99
1.47	0.89	0.87	0.81	0.33	4.37	1.64	0.47	0.70	0.68	0.80	1.21	1.99
2.72	0.92	0.95	0.97	0.53	1.17							

sudanensis[6]

1.46	1.01	1.64	1.44	0.74	1.32	0.82	1.19	0.36	0.80	2.16	1.48	0.99
1.67	0.90	0.78	0.83	0.52	4.54	1.36	0.55	0.76	0.66	0.84	1.28	2.26
2.71	1.06	0.87	1.13	0.43	1.24							

sudanensis[7]

1.46	1.02	1.63	1.47	0.76	1.33	0.88	1.11	0.39	0.87	2.05	1.30	1.02
1.64	0.89	0.77	0.83	0.42	4.18	1.60	0.43	0.80	0.66	0.71	1.42	2.39
2.74	1.08	0.90	1.08	0.47	1.63							

sudanensis[8]

1.48	0.95	1.54	1.44	0.70	1.33	0.79	1.53	0.37	0.84	2.30	1.45	1.04

1.63	0.88	0.78	0.82	0.42	4.11	1.61	0.48	0.74	0.67	0.75	1.20	2.22
2.48	1.06	0.84	1.09	0.52	1.11							
sudanensis[9]												
1.42	0.91	1.53	1.53	0.76	1.36	0.83	0.97	0.38	0.88	2.04	1.38	0.99
1.63	0.89	0.86	0.84	0.39	3.95	1.65	0.43	0.71	0.60	0.74	1.29	2.03
2.84	0.98	0.91	1.11	0.52	1.31							
sudanensis[10]												
1.38	1.02	1.48	1.53	0.67	1.43	0.84	1.18	0.40	0.94	2.21	1.43	1.03
1.61	0.92	0.78	0.80	0.43	4.54	1.48	0.57	0.77	0.70	0.86	1.16	2.18
2.58	1.01	0.91	1.08	0.52	1.27							
sudanensis[11]												
1.54	0.90	1.56	1.40	0.71	1.46	0.81	1.27	0.36	1.10	2.16	1.43	1.08
1.53	0.90	0.86	0.82	0.39	4.04	1.57	0.47	0.75	0.65	0.77	1.20	1.95
2.47	0.93	0.90	0.98	0.56	1.00							
sudanensis[12]												
1.56	1.04	1.59	1.40	0.63	1.27	0.86	1.24	0.40	0.80	2.06	1.39	1.05
1.72	0.92	0.77	0.82	0.46	4.29	1.46	0.52	0.78	0.69	0.82	1.28	2.33
2.68	1.11	0.87	1.04	0.48	1.50							
sudanensis[13]												
1.44	1.03	1.57	1.55	0.71	1.30	0.83	1.05	0.39	0.89	2.22	1.46	1.12
1.68	0.88	0.76	0.86	0.31	4.49	1.60	0.55	0.79	0.68	0.74	1.42	2.48
2.91	1.06	0.99	1.03	0.50	1.45							
sudanensis[14]												
1.45	0.92	1.53	1.50	0.68	1.28	0.78	1.03	0.36	0.92	2.19	1.40	1.00
1.52	0.86	0.80	0.82	0.35	4.24	1.78	0.44	0.72	0.64	0.78	1.04	2.21
2.73	1.08	0.89	1.04	0.56	1.67							
sudanensis[15]												
1.40	1.00	1.60	1.51	0.76	1.38	0.85	1.22	0.37	0.76	2.00	1.50	1.10
1.59	0.94	0.71	0.85	0.44	4.55	1.57	0.49	0.70	0.67	0.79	1.38	2.48
2.93	1.05	0.96	1.02	0.51	1.07							
sudanensis[16]												
1.38	1.00	1.59	1.51	0.77	1.25	0.80	1.36	0.37	0.83	2.24	1.35	1.05
1.64	0.89	0.77	0.86	0.36	4.44	1.46	0.49	0.58	0.66	0.75	1.21	2.17
2.51	0.93	0.95	1.10	0.45	1.68							

sudanensis[17]

1.38	0.99	1.57	1.56	0.75	1.35	0.88	1.29	0.40	0.80	2.34	1.49	1.05
1.61	0.90	0.77	0.80	0.45	4.20	1.66	0.49	0.76	0.70	0.69	1.35	2.36
2.72	1.04	0.97	1.02	0.52	1.35							

testaceus (holotype)

1.54	1.02	1.63	1.43	0.67	1.46	0.86	1.79	0.47	0.79	2.29	1.69	1.03
1.61	0.86	0.83	0.87	1.17	2.76	1.94	0.31	0.74	0.71	0.73	1.20	2.41
2.67	1.30	0.85	0.98	0.40	1.16							

testaceus[1]

1.57	1.00	1.54	1.32	0.60	1.42	0.81	1.51	0.43	0.79	2.61	1.77	1.10
1.75	0.88	0.84	0.86	0.99	2.50	1.73	0.35	0.67	0.68	0.75	1.39	2.29
2.64	1.17	0.89	1.01	0.41	0.94							

testaceus[2]

1.56	0.95	1.56	1.34	0.63	1.44	0.84	1.76	0.46	0.84	2.53	1.81	1.14
1.69	0.89	0.84	0.88	1.46	2.40	1.78	0.29	0.65	0.71	0.63	1.28	2.30
2.94	1.12	0.91	1.02	0.55	0.85							

testaceus[3]

1.53	0.94	1.54	1.52	0.60	1.22	0.93	1.22	0.40	0.83	2.26	1.74	1.04
1.68	0.92	0.73	0.87	1.52	2.88	2.06	0.26	0.77	0.74	0.77	1.64	2.14
2.58	1.04	0.94	1.01	0.51	0.48							

testaceus[4]

1.55	0.95	1.46	1.36	0.58	1.38	0.80	1.87	0.47	0.88	2.00	1.87	1.10
1.68	0.90	0.73	0.88	3.13	2.33	1.86	0.31	0.63	0.70	0.65	1.91	2.01
2.84	1.01	0.90	1.01	0.46	0.75							

testaceus[5]

1.56	0.99	1.59	1.43	0.75	1.37	0.90	1.50	0.42	0.83	2.33	1.79	0.98
1.68	0.90	0.77	0.87	0.95	3.22	2.37	0.28	0.65	0.71	0.61	1.51	1.73
2.25	0.90	0.86	1.01	0.48	0.76							

testaceus[6]

1.71	0.98	1.69	1.39	0.63	1.31	0.78	1.43	0.49	0.87	2.83	1.83	1.02
1.65	0.88	0.80	0.90	1.21	2.27	1.58	0.33	0.75	0.75	0.66	1.46	1.93
2.36	1.03	0.88	1.02	0.48	0.77							

testaceus[7]

1.54	0.95	1.63	1.38	0.72	1.35	0.87	1.57	0.42	0.82	2.23	1.68	1.07
1.61	0.88	0.79	0.88	1.06	2.94	1.86	0.31	0.66	0.71	0.79	1.43	2.33
2.74	1.19	0.85	0.97	0.47	0.74							

testaceus[8]

1.47	0.97	1.62	1.48	0.71	1.31	0.88	1.25	0.40	0.90	2.18	1.78	1.09
1.72	0.84	0.82	0.90	1.13	2.22	1.93	0.30	0.76	0.74	0.61	1.54	2.40
3.18	1.16	0.98	0.93	0.42	1.41							

testaceus[9]

1.63	0.99	1.51	1.37	0.64	1.35	0.88	1.24	0.45	0.79	2.52	1.66	0.93
1.73	0.93	0.81	0.87	1.16	2.41	1.62	0.31	0.68	0.77	0.61	1.52	2.17
2.57	1.07	0.92	1.03	0.46	1.13							

testaceus[10]

1.57	0.94	1.60	1.37	0.68	1.37	0.90	1.47	0.46	0.82	2.35	1.78	1.12
1.58	0.87	0.80	0.85	1.26	2.42	1.61	0.32	0.63	0.71	0.75	1.36	2.22
2.63	1.22	0.83	1.00	0.45	0.92							

testaceus[11]

1.47	0.95	1.55	1.54	0.74	1.38	0.86	1.46	0.48	0.87	2.19	1.87	1.11
1.68	0.87	0.85	0.88	1.25	2.61	3.59	0.17	0.73	0.66	0.67	1.22	2.17
2.56	1.09	0.90	1.02	0.46	0.70							

testaceus[12]

1.58	0.96	1.63	1.31	0.68	1.39	0.86	1.76	0.41	0.79	2.19	1.66	0.96
1.57	0.89	0.81	0.85	0.93	2.83	2.04	0.28	0.64	0.61	0.72	1.26	1.95
2.42	1.15	0.88	1.01	0.45	0.92							

testaceus[13]

1.52	0.94	1.62	1.40	0.70	1.36	0.88	1.81	0.43	0.93	2.92	2.04	1.06
1.61	0.87	0.83	0.84	1.23	2.45	2.33	0.24	0.67	0.66	0.78	1.34	2.38
2.82	1.23	0.87	0.97	0.41	0.89							

testaceus[14]

1.56	1.07	1.52	1.39	0.62	1.54	0.82	1.72	0.46	0.86	2.37	1.64	1.07
1.64	0.94	0.77	0.86	1.03	2.25	1.80	0.31	0.67	0.72	0.77	1.29	2.39
2.78	1.21	0.85	0.99	0.33	1.08							

tharensis (paratype)

1.50	1.05	1.57	1.30	0.62	1.33	0.92	1.50	0.34	0.81	2.30	1.58	1.04
1.70	0.88	0.85	0.84	0.41	4.15	1.54	0.43	0.77	0.70	0.76	1.13	2.40
3.10	1.03	0.99	1.03	0.50	1.25							

thisbe (lectotype)

1.43	0.98	1.51	1.44	0.66	1.33	0.74	1.44	0.40	0.93	1.52	1.26	1.05
1.76	0.90	0.78	0.86	0.67	3.18	1.35	0.42	0.70	0.70	0.78	1.35	2.62
3.14	1.11	1.00	1.00	0.57	1.00							

thisbe (paralectotype)

1.49	0.98	1.60	1.39	0.74	1.31	0.78	1.57	0.46	0.96	1.57	1.38	1.00
1.73	0.90	0.78	0.87	0.49	3.28	1.56	0.43	0.77	0.72	0.73	1.41	2.60
2.92	1.13	0.96	0.98	0.49	1.27							

thisbe[1]

1.50	0.96	1.58	1.43	0.71	1.21	0.81	1.23	0.43	0.86	1.90	1.53	1.10
1.75	0.91	0.87	0.85	0.55	4.13	1.45	0.46	0.66	0.62	0.65	1.49	2.76
2.94	1.12	1.01	1.04	0.55	1.04							

thisbe[2]

1.51	0.86	1.44	1.51	0.66	1.26	0.89	1.40	0.43	1.09	1.31	1.35	1.17
1.57	0.78	0.84	0.90	0.73	2.70	1.41	0.39	0.71	0.69	0.75	1.14	1.78
2.11	0.73	0.99	0.94	0.41	1.13							

thisbe[3]

1.48	0.96	1.52	1.55	0.73	1.18	0.89	1.55	0.46	0.96	1.66	1.44	1.06
1.85	0.90	0.81	0.85	0.40	3.22	1.31	0.46	0.69	0.72	0.78	1.20	2.11
2.46	0.94	1.04	0.97	0.43	0.99							

thisbe[4]

1.43	0.92	1.57	1.51	0.72	1.43	0.92	1.32	0.40	1.03	1.61	1.39	1.08
1.78	0.83	0.86	0.87	0.65	3.33	1.40	0.45	0.68	0.71	0.70	1.39	2.06
2.30	0.89	1.04	0.98	0.48	0.99							

thisbe[5]

1.46	0.93	1.50	1.54	0.68	1.15	1.03	1.40	0.39	1.10	1.56	1.50	1.05
1.59	0.89	0.79	0.86	0.76	3.53	1.45	0.43	0.72	0.66	0.80	1.24	2.11
2.32	0.95	0.97	1.00	0.57	0.83							

thisbe[6]

1.57	1.01	1.55	1.39	0.76	1.44	0.91	1.38	0.48	1.02	1.56	1.28	1.07
1.82	0.84	0.80	0.93	0.95	3.34	1.49	0.44	0.72	0.65	0.52	1.69	2.73
2.87	0.99	1.08	0.95	0.56	0.85							

thisbe[7]

1.56	0.96	1.61	1.52	0.74	1.17	0.89	1.52	0.41	0.90	1.42	1.42	1.12
1.76	0.88	0.77	0.89	0.61	3.63	1.37	0.49	0.72	0.65	0.78	1.34	2.48
2.60	1.00	0.99	0.97	0.46	0.92							

thisbe[8]

1.55	0.99	1.60	1.35	0.58	1.29	0.86	1.58	0.43	0.85	1.68	1.35	0.98
1.85	0.91	0.80	0.88	0.72	3.02	1.28	0.48	0.64	0.67	0.79	1.58	2.91
3.00	1.13	1.07	0.99	0.56	1.17							

thisbe[9]

1.52	0.94	1.64	1.33	0.80	1.27	0.91	1.62	0.43	0.97	1.85	1.50	0.99
1.77	0.90	0.78	0.86	0.61	3.74	1.36	0.47	0.74	0.70	0.73	1.49	2.58
2.76	1.05	1.04	1.00	0.49	1.28							

thisbe[10]

1.47	0.99	1.71	1.49	0.81	1.26	0.85	1.37	0.48	0.85	1.74	1.29	1.01
1.70	0.91	0.82	0.81	0.62	4.00	1.38	0.53	0.79	0.78	0.60	1.45	2.91
3.19	1.10	1.05	1.01	0.48	1.04							

thisbe[11]

1.50	0.96	1.59	1.42	0.72	1.31	0.91	1.76	0.41	0.91	1.68	1.38	1.04
1.76	0.89	0.76	0.91	0.82	3.03	1.35	0.43	0.73	0.79	0.66	1.31	2.37
2.78	1.07	1.01	1.04	0.44	0.77							

thisboides (holotype)

1.49	0.98	1.60	1.39	0.74	1.31	0.78	1.57	0.46	0.96	1.57	1.38	1.00
1.73	0.90	0.78	0.87	0.49	3.28	1.56	0.43	0.77	0.72	0.73	1.41	2.60
2.92	1.13	0.96	0.98	0.49	1.27							

thisboides (paratype)[1]

1.53	0.99	1.69	1.41	0.79	1.13	1.05	1.24	0.42	1.04	1.62	1.42	1.10
1.84	0.88	0.76	0.85	0.53	4.11	1.31	0.57	0.74	0.70	0.82	1.26	2.38
2.57	0.89	1.12	1.04	0.44	1.21							

thisboides (paratype)[2]

1.70	0.93	1.55	1.33	0.74	1.11	0.97	1.11	0.40	0.97	1.72	1.52	1.43
1.71	0.88	0.79	0.86	0.72	3.37	1.38	0.43	0.74	0.71	0.59	1.29	2.13
2.38	0.95	1.06	0.95	0.43	1.34							

thisboides (paratype)[3]

1.56	0.94	1.72	1.39	0.83	1.25	1.04	1.69	0.45	0.94	1.57	1.30	1.00
1.75	0.86	0.79	0.91	0.37	4.20	1.35	0.49	0.88	0.69	0.74	1.40	2.62
2.53	0.93	1.11	0.96	0.44	1.28							

thisboides (paratype)[4]

1.48	1.00	1.60	1.42	0.80	1.26	0.99	1.11	0.38	0.93	1.55	1.41	0.91
1.79	0.90	0.76	0.89	0.69	3.28	1.27	0.47	0.77	0.68	0.76	1.15	2.30
2.70	0.97	1.07	1.00	0.48	1.50							

thisboides (paratype)[5]

1.49	1.02	1.50	1.53	0.75	1.34	1.14	1.12	0.40	0.85	1.80	1.44	0.89
1.75	0.82	0.76	0.89	0.58	3.90	1.86	0.46	0.80	0.73	0.60	1.56	2.48
2.59	1.00	1.00	0.99	0.53	1.29							

thisboides (paratype)[6]

1.49	1.07	1.53	1.48	0.70	1.38	1.01	1.45	0.37	0.88	1.86	1.47	1.02
1.75	0.88	0.69	0.93	0.94	4.00	1.52	0.66	0.69	0.71	0.82	1.54	1.61
1.98	0.76	0.99	1.01	0.44	1.29							

thisboides (paratype)[7]

1.64	0.99	1.76	1.35	0.86	1.02	1.05	1.31	0.39	0.84	1.55	1.55	1.07
1.72	0.86	0.82	0.90	0.65	3.33	1.20	0.52	0.76	0.71	0.68	1.30	2.11
2.28	0.85	1.00	1.04	0.41	1.09							

thisboides (paratype)[8]

1.51	1.05	1.69	1.44	0.77	1.20	0.80	1.40	0.40	0.81	1.69	1.42	1.33
1.79	0.89	0.81	0.88	0.76	4.11	1.46	0.50	0.73	1.43	0.58	1.55	2.25
2.43	0.88	1.07	1.02	0.40	1.07							

thisboides (paratype)[9]

1.47	0.94	1.52	1.47	0.72	1.25	1.06	1.36	0.46	0.94	1.55	1.36	0.94
1.72	0.88	0.79	0.90	0.60	3.65	1.47	0.46	0.69	0.71	0.71	1.47	2.30
2.48	0.95	1.04	1.00	0.46	1.15							

thisboides (paratype)[10]

1.59	1.04	1.54	1.43	0.72	1.25	0.82	1.42	0.44	0.88	1.71	1.50	1.31

1.87	0.93	0.74	0.90	0.48	3.25	1.30	0.48	0.77	0.73	0.74	1.49	2.55
2.56	1.04	0.99	1.02	0.47	1.34							
thisboides (paratype)[11]												
1.50	0.96	1.57	1.62	0.77	1.15	1.17	2.01	0.42	0.85	2.22	1.85	1.09
1.61	0.87	0.80	0.87	1.44	2.33	1.75	0.31	0.76	0.75	0.58	1.53	1.79
2.45	0.86	0.97	1.02	0.52	1.27							
thisboides (paratype)[12]												
1.55	0.99	1.59	1.43	0.80	1.34	0.80	1.31	0.38	0.85	1.55	1.44	0.89
1.79	0.93	0.82	0.89	0.65	4.10	1.25	0.51	0.79	1.30	0.79	1.39	1.90
2.40	0.87	0.97	1.00	0.45	1.10							
thisboides (paratype)[13]												
1.48	0.94	1.52	1.53	0.77	1.25	1.17	1.42	0.40	0.94	1.71	1.50	1.09
1.61	0.88	0.76	0.87	0.94	3.50	1.45	0.43	0.72	0.98	0.65	1.50	2.05
2.51	0.98	1.05	1.03	0.51	1.25							
tortilis (holotype)												
1.54	0.93	1.56	1.49	0.62	1.30	0.77	1.95	0.41	0.87	1.99	1.55	1.02
1.73	0.90	0.77	0.90	1.77	2.32	1.55	0.35	0.76	0.75	0.64	1.64	2.06
2.40	1.07	0.90	0.99	0.56	0.53							
tortilis (paratype)[1]												
1.39	0.97	1.56	1.55	0.69	1.35	0.89	1.53	0.39	0.88	2.23	1.77	1.02
1.77	0.90	0.79	0.87	1.73	2.39	1.72	0.29	0.73	0.69	0.68	1.52	2.04
2.36	1.08	0.88	1.03	0.50	0.65							
tortilis (paratype)[2]												
1.45	0.97	1.54	1.49	0.65	1.28	0.89	1.50	0.44	0.74	2.05	1.58	1.11
1.83	0.90	0.79	0.87	1.78	1.87	1.58	0.29	0.76	0.73	0.60	1.41	2.14
2.52	1.10	0.91	0.98	0.62	0.57							
tortilis (paratype)[3]												
1.47	0.90	1.60	1.47	0.62	1.28	0.91	1.97	0.38	0.86	1.77	1.58	1.07
1.65	0.91	0.82	0.87	1.61	2.27	1.67	0.29	0.71	0.74	0.60	1.57	1.90
2.85	1.09	0.81	1.07	0.52	0.76							
tortilis (paratype)[4]												
1.43	0.91	1.48	1.59	0.68	1.30	0.86	1.60	0.38	0.85	2.01	1.70	1.05
1.62	0.91	0.82	0.85	1.43	2.68	1.95	0.29	0.73	0.68	0.61	1.37	2.01

2.61	1.10	0.85	1.01	0.53	0.72							
tortilis (paratype)[5]												
1.54	0.84	1.57	1.41	0.61	1.29	0.86	1.86	0.38	0.82	1.83	1.50	1.04
1.56	0.87	0.79	0.86	1.67	1.60	1.88	0.26	0.82	0.75	0.62	1.41	1.68
2.38	1.08	0.78	1.09	0.57	0.44							
tortilis (paratype)[6]												
1.49	0.94	1.58	1.23	0.68	1.36	0.86	1.99	0.40	0.87	2.11	1.59	0.96
1.76	0.90	0.85	0.87	1.63	2.17	1.72	0.30	0.72	0.73	0.61	1.33	1.88
2.36	0.99	0.88	1.07	0.50	0.71							
tortilis (paratype)[7]												
1.47	0.92	1.50	1.49	0.64	1.33	0.85	1.70	0.46	0.82	2.17	1.61	1.04
1.68	0.92	0.76	0.87	1.43	2.12	2.00	0.24	0.76	0.74	0.65	1.34	2.04
2.33	1.05	0.89	0.97	0.56	0.58							
tortilis (paratype)[8]												
1.43	0.97	1.57	1.59	0.68	1.29	0.85	1.70	0.40	0.86	2.01	1.50	1.04
1.69	0.90	0.85	0.87	1.77	2.60	1.88	0.28	0.76	0.69	0.65	1.50	1.90
2.40	1.09	0.95	1.01	0.60	0.63							
trochantalis (holotype)												
1.54	0.90	1.56	1.40	0.71	1.46	0.81	1.27	0.36	1.10	2.16	1.43	1.08
1.53	0.90	0.86	0.82	0.39	4.04	1.57	0.47	0.75	0.65	0.77	1.20	1.95
2.47	0.93	0.90	0.98	0.56	1.00							

APPENDIX VIII. Data matrix for phenetic analysis of 447 specimens comprising 52 species of *Tricholabiodes* using the coded characters as in Appendix VI. For the following species: *T. palaestinensis*, *T. scorteccii*, *T. signatipennis*, *T. stigmaticus* and *T. trochantalis*, not all the measured specimens included in the final description were used in the phenetic analysis since they were only received after completion of this analysis. The first variable is 0 and the last is 124.

acer (holotype)

0 1 1 2 2 0 0 0 1 0 2 0 1 1 1 0 0 2 2 0 1 1 1 2 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 0 0 1 0 0 1 1 0 0 0 1 0 0 1 0 0 1 2 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 0 0 1 0 2 1 2 0 0 0 0 2 1 1 1 0 0 0 1 0 0 1 0 1 2 0 1 0 0 0
1 0 0 0 0

acer (paratype)[1]

0 1 1 2 2 0 0 0 1 0 1 0 0 1 1 0 0 2 2 0 1 1 1 2 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 0 0 0 0 0 1 1 0 0 0 1 0 0 1 0 0 1 2 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 0 0 1 0 2 1 2 0 0 0 0 2 1 1 1 0 0 0 1 0 0 1 0 1 2 0 1 0 0 0
1 0 0 0 0

acer (paratype)[2]

0 1 1 2 2 0 0 0 1 0 2 0 1 1 1 0 0 2 2 0 1 1 1 2 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 0 0 1 0 0 1 1 0 0 0 1 0 0 1 0 0 1 2 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 0 0 1 0 2 1 2 0 0 0 0 2 1 1 1 0 0 0 1 0 0 1 0 1 2 0 1 0 0 0
1 0 0 0 0

acer (paratype)[3]

0 1 1 2 2 0 0 0 1 0 2 0 1 1 1 0 0 2 2 0 1 1 1 2 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 0 0 1 0 0 1 1 0 0 0 1 0 0 1 0 0 1 2 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 0 0 1 0 2 1 2 0 0 0 0 2 1 1 1 0 0 0 1 0 0 1 0 1 2 0 1 0 0 0
1 0 0 0 0

acer (paratype)[4]

0 1 1 2 2 0 0 0 1 0 2 0 1 1 1 0 0 2 2 0 1 1 1 2 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 0 0 1 0 0 1 1 0 0 0 1 0 0 1 0 0 1 2 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 0 0 1 0 2 1 2 0 0 0 0 2 1 1 1 0 0 0 1 0 0 1 0 1 2 0 1 0 0 0
1 0 0 0 0

acer (paratype)[5]

0 1 1 2 2 0 0 0 1 0 2 0 1 1 1 0 0 2 2 0 1 1 1 2 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 0 0 1 0 0 1 1 0 0 0 1 0 0 1 0 0 1 2 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0

11 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 2 1 2 0 0 0 0 2 1 1 1 0 0 0 1 0 0 1 0 1 2 0 1 0 0 0
1 0 0 0 0

alveolus (holotype)

0 1 1 1 2 0 0 0 1 0 2 0 1 2 2 0 0 2 2 0 1 2 1 9 0 2 0 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 2 0 1 0 0 0 0 0 1 1 1 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 1 3 0 0 0 0 2 1 1 1 0 0 0 0 0 2 0 0 0 0 0 0 1 1 1
0 0 0 0 0

andrei (holotype)

0 0 0 1 0 0 0 1 0 2 0 1 0 2 2 0 0 0 1 0 1 0 0 4 1 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
1 0 0 1 0 0 0 0 0 0 0 1 1 0 0 1 0 0 1 1 0 3 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
9 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 1 0 0 0 0 1 2 1 1 1 0 0 0 0 1 2 0 0 0 1 0 0 0 0 1
0 0 0 1 1

andrei (paratype)[1]

0 0 0 1 0 0 0 1 0 2 0 1 0 2 2 0 0 0 1 0 1 0 0 4 1 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
1 0 0 1 0 0 0 0 0 0 0 1 1 0 0 1 0 0 1 1 0 3 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
9 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 1 0 0 0 0 1 2 1 1 1 0 0 0 0 1 2 0 0 0 1 0 0 0 0 1
0 0 0 1 1

andrei[1]

0 0 1 1 0 0 0 1 0 2 0 1 0 2 2 0 0 0 1 0 1 1 1 4 1 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
1 0 0 1 0 0 0 0 0 0 0 1 1 0 0 1 0 0 1 1 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
9 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 1 0 0 0 0 1 2 1 1 1 0 0 0 0 1 2 0 0 0 1 0 0 0 0 1
0 0 0 1 1

andrei[2]

0 0 0 1 0 0 0 1 0 2 0 1 0 2 2 0 0 0 1 0 1 0 0 4 1 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
1 0 0 1 0 0 0 0 0 0 0 1 1 0 0 1 0 0 1 1 0 3 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
9 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 1 0 0 0 0 1 2 1 1 1 0 0 0 0 1 2 0 0 0 1 0 0 0 0 1
0 0 0 1 1

andrei[3]

0 0 1 1 0 0 0 1 0 2 0 1 0 2 2 0 0 0 1 0 1 1 1 4 1 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
1 0 0 1 0 0 0 0 0 0 0 1 1 0 0 1 0 0 1 1 0 1 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
9 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 1 0 0 0 0 1 2 1 1 1 0 0 0 0 1 2 0 0 0 1 0 0 0 0 1
0 0 0 1 1

andrei[4]

0 0 1 1 0 0 0 1 0 2 0 1 0 2 2 0 0 0 1 0 1 0 0 4 1 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
1 0 0 1 0 0 0 0 0 0 0 1 1 0 0 1 0 0 1 1 0 3 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
9 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 1 0 1 0 0 0 0 1 2 1 1 1 0 0 0 0 1 2 0 0 0 1 0 0 0 0 1
0 0 0 1 1

andrei[5]

0 0 0 1 0 0 0 1 0 2 0 1 0 2 2 0 0 0 1 0 1 0 0 4 1 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
1 0 0 1 0 0 0 0 0 0 0 1 1 0 0 1 0 0 1 1 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
9 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 1 0 1 0 0 0 0 1 2 1 1 1 0 0 0 0 1 2 0 0 0 1 0 0 0 0 1
0 0 0 1 1

andrei[6]

0 0 0 1 0 0 0 1 0 2 0 1 0 2 2 0 0 0 1 0 1 1 1 4 1 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
1 0 0 1 0 0 0 0 0 0 0 1 1 0 0 1 0 0 1 1 0 3 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
9 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 1 0 1 0 0 0 0 1 2 1 1 1 0 0 0 0 1 2 0 0 0 1 0 0 0 0 1
0 0 0 1 1

andrei[7]

0 0 0 1 0 0 0 1 0 2 0 1 0 2 2 0 0 0 1 0 1 1 1 4 1 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
1 0 0 1 0 0 0 0 0 0 0 1 1 0 0 1 0 0 1 1 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
9 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 1 0 1 0 0 0 0 1 2 1 1 1 0 0 0 0 1 2 0 0 0 1 0 0 0 0 1
0 0 0 1 1

arabicus (holotype)

0 1 1 2 1 0 0 1 2 0 2 0 1 2 1 0 0 2 2 0 1 1 2 7 0 2 1 0 1 1 0 0 1 0 0 0 0 0 0 1
0 0 0 1 1 1 1 0 0 0 0 2 1 0 0 1 0 0 1 0 1 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
9 0 0 0 0 0 0 1 0 0 1 0 1 0 1 2 2 0 0 0 1 1 1 1 1 0 0 0 0 1 2 0 0 2 2 0 2 0 0 1
0 0 0 0 0

arabicus (paratype)[1]

0 1 1 2 1 0 0 1 2 0 2 0 1 2 1 0 0 2 2 0 1 1 2 7 0 2 1 0 1 1 0 0 1 0 0 0 0 0 0 1
0 0 0 1 1 1 1 0 0 0 0 2 1 0 0 1 0 0 1 0 1 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
9 0 0 0 0 0 0 1 0 0 1 0 1 0 1 2 2 0 0 0 1 2 1 1 1 0 0 0 0 1 2 0 0 2 2 0 2 0 0 1
0 0 0 0 0

arabicus (paratype)[2]

0 1 1 2 1 0 0 1 2 0 2 0 1 2 1 0 0 2 2 0 1 1 2 7 0 2 1 0 1 1 0 0 1 0 0 0 0 0 0 1
0 0 0 1 0 1 0 0 0 0 2 1 0 0 1 0 0 1 0 1 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

9 0 0 0 0 0 0 1 0 0 1 0 1 0 1 2 2 0 0 0 1 2 1 1 1 0 0 0 0 1 2 0 0 2 2 0 2 0 0 1 0 0 0 0 0

arabicus[1]

0 1 1 2 1 0 0 1 2 0 2 0 1 2 1 0 0 2 2 0 1 1 2 7 0 2 1 0 1 1 0 0 1 0 0 0 0 0 0 1 0 0 0 1 1 1 1 0 0 0 0 2 1 0 0 1 0 0 1 0 1 2 2 0 0 0 0 0 0 0 0 0 0 0 0 9 0 0 0 0 0 0 1 0 0 1 0 1 0 1 2 2 0 0 0 1 2 1 1 1 0 0 0 0 1 2 0 0 2 2 0 2 0 0 1 0 0 0 0 0

arabicus[2]

0 1 1 2 1 0 0 1 2 0 2 0 1 2 1 0 0 2 2 0 1 1 2 7 0 2 1 0 1 1 0 0 1 0 0 0 0 0 0 1 0 0 0 1 1 1 1 0 0 0 0 2 1 0 0 1 0 0 1 0 1 2 2 0 0 0 0 0 0 0 0 0 0 0 0 9 0 0 0 0 0 0 1 0 0 1 0 1 0 1 2 2 0 0 0 1 2 0 0 1 0 0 0 0 1 2 0 0 2 2 0 2 0 0 1 0 0 0 0 0

arabicus[3]

0 1 1 2 1 0 0 1 2 0 2 0 1 2 1 0 0 1 2 0 1 1 1 7 0 2 1 0 1 1 0 0 1 0 0 0 0 0 0 1 0 0 0 1 1 1 1 0 0 0 0 2 1 0 0 1 0 0 1 0 1 2 2 0 0 0 0 0 0 0 0 0 0 0 0 9 0 0 0 0 0 0 1 0 0 1 0 1 0 1 2 2 0 0 0 1 2 1 1 1 0 0 0 0 1 2 0 0 2 2 0 2 0 0 1 0 0 0 0 0

arabicus[4]

0 1 1 2 1 0 0 1 2 0 2 0 1 2 1 0 0 2 2 0 1 1 2 7 0 2 1 0 1 1 0 0 1 0 0 0 0 0 0 1 0 0 0 1 1 1 1 0 0 0 1 2 1 0 0 1 0 0 1 0 1 2 2 0 0 0 0 0 0 0 0 0 0 0 0 9 0 0 0 0 0 0 1 0 0 1 0 1 0 1 2 2 0 0 0 1 2 1 1 1 0 0 0 0 1 2 0 0 2 2 0 2 0 0 1 0 0 0 0 0

arabicus[5]

0 1 1 2 1 0 0 1 2 0 2 0 1 2 1 0 0 1 2 0 1 1 1 7 0 2 1 0 1 1 0 0 1 0 0 0 0 0 0 1 0 0 0 1 1 1 1 0 0 0 0 2 1 0 0 1 0 0 1 0 1 2 2 0 0 0 0 0 0 0 0 0 0 0 0 9 0 0 0 0 0 0 1 0 0 1 0 1 0 1 2 2 0 0 0 1 2 1 1 1 0 0 0 0 1 2 0 0 2 2 0 2 0 0 1 0 0 0 0 0

arabicus[6]

0 1 1 2 1 0 0 1 2 0 2 0 1 2 1 0 0 2 2 0 1 1 2 7 0 2 1 0 1 1 0 0 1 0 0 0 0 0 0 1 0 0 0 1 0 1 0 0 0 0 0 2 1 0 0 1 0 0 1 0 1 2 2 0 0 0 0 0 0 0 0 0 0 0 0 9 0 0 0 0 0 0 1 0 0 1 0 1 0 1 2 2 0 0 0 1 2 1 1 1 0 0 0 0 1 2 0 0 2 2 0 2 0 0 1 0 0 0 0 0

arabicus[7]

0 1 1 2 1 0 0 1 2 0 2 0 1 2 1 0 0 2 2 0 1 1 2 7 0 2 1 0 1 1 0 0 1 0 0 0 0 0 0 1

0001010000 1210010010 1120000000 0000000000
9000000100 1010122000 1211100001 2002202001
00000

arabicus[8]

0112100120 2012100220 1127021011 0010000001
0001010000 2210010010 1120000000 0000000000
9000000100 1010122000 1211100001 2002202001
00000

arabicus[9]

0112100120 2012100220 1127021011 0010000001
0001111000 0210010010 1120000000 0000000000
9000000100 1010122000 1211100001 2002202001
00000

arabicus[10]

0112100120 2012100220 1127021011 0010000001
0001010000 0210010010 1120000000 0000000000
9000000100 1010122000 1200100001 2002202001
00000

arabicus[11]

0112100120 2012100220 1127021011 0010000001
0001010000 0210010010 1120000000 0000000000
9000000100 1010122000 1200100001 2002202001
00000

arabicus[12]

0112100120 2012100120 1117021011 0010000001
0001111000 0210010010 1220000000 0000000000
9000000100 1010122000 1200100001 2002202001
00000

arabicus[13]

0112100120 2012100120 1117021011 0010000001
0001111000 0210010010 1220000000 0000000000
9000000100 1010122000 1200100001 2002202001
00000

arabicus[14]

0 1 1 2 1 0 0 1 2 0 2 0 1 2 1 0 0 2 2 0 1 1 2 7 0 2 1 0 1 1 0 0 1 0 0 0 0 0 1

0 0 0 1 1 1 1 0 0 0 2 2 1 0 0 1 0 0 1 0 1 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

9 0 0 0 0 0 0 0 1 0 0 1 0 1 0 1 2 2 0 0 0 1 2 1 1 1 0 0 0 0 1 2 0 0 2 2 0 2 0 0 1

0 0 0 0 0

arabicus[15]

0 1 1 2 1 0 0 1 2 0 2 0 1 2 1 0 0 1 2 0 1 1 1 7 0 2 1 0 1 1 0 0 1 0 0 0 0 0 1

0 0 0 1 1 1 1 0 0 0 0 2 1 0 0 1 0 0 1 0 1 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

9 0 0 0 0 0 0 0 1 0 0 1 0 1 0 1 2 2 0 0 0 1 2 1 1 1 0 0 0 0 1 2 0 0 2 2 0 2 0 0 1

0 0 0 0 0

arabicus[16]

0 1 1 2 1 0 0 1 2 0 2 0 1 2 1 0 0 1 2 0 1 1 1 7 0 2 1 0 1 1 0 0 1 0 0 0 0 0 1

0 0 0 1 1 1 1 0 0 0 0 2 1 0 0 1 0 0 1 0 1 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

9 0 0 0 0 0 0 0 1 0 0 1 0 1 0 1 2 2 0 0 0 1 2 0 0 1 0 0 0 0 1 2 0 0 2 2 0 2 0 0 1

0 0 0 0 0

arabicus[17]

0 1 1 2 1 0 0 1 2 0 2 0 1 2 1 0 0 1 2 0 1 1 1 7 0 2 1 0 1 1 0 0 1 0 0 0 0 0 1

0 0 0 1 1 1 1 0 0 0 0 2 1 0 0 1 0 0 1 0 1 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

9 0 0 0 0 0 0 0 1 0 0 1 0 1 0 1 2 2 0 0 0 1 2 1 1 1 0 0 0 0 1 2 0 0 2 2 0 2 0 0 1

0 0 0 0 0

arabicus[18]

0 1 1 2 1 0 0 1 2 0 2 0 1 2 1 0 0 2 2 0 1 1 2 7 0 2 1 0 1 1 0 0 1 0 0 0 0 0 1

0 0 0 1 1 1 1 0 0 0 1 2 1 0 0 1 0 0 1 0 1 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

9 0 0 0 0 0 0 0 1 0 0 1 0 1 0 1 2 2 0 0 0 1 2 1 1 1 0 0 0 0 1 2 0 0 2 2 0 2 0 0 1

0 0 0 0 0

arabicus[19]

0 1 1 2 1 0 0 1 2 0 2 0 1 2 1 0 0 2 2 0 1 1 2 7 0 2 1 0 1 1 0 0 1 0 0 0 0 0 1

0 0 0 1 1 1 1 0 0 0 0 2 1 0 0 1 0 0 1 0 1 1 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

9 0 0 0 0 0 0 0 1 0 0 1 0 1 0 1 2 2 0 0 0 1 2 1 1 1 0 0 0 0 1 2 0 0 2 2 0 2 0 0 1

0 0 0 0 0

arabicus[20]

0 1 1 2 1 0 0 1 2 0 2 0 1 2 1 0 0 2 2 0 1 1 2 7 0 2 1 0 1 1 0 0 1 0 0 0 0 0 1

0 0 0 1 0 1 0 0 0 0 0 2 1 0 0 1 0 0 1 0 1 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

9 0 0 0 0 0 0 0 1 0 0 1 0 1 0 1 2 2 0 0 0 1 2 0 0 1 0 0 0 0 1 2 0 0 2 2 0 2 0 0 1

00000

arabicus[21]

0112100120 2012100120 1117021011 0010000001
0001111000 0210010010 1220000000 0000000000
9000000100 1010122000 1211100001 2002202001
00000

asiaticus (paralectotype)

0112200110 2012100220 1216021011 0020000000
0001001001 0111131010 1110000000 0000000000
7000000000 0120213000 1200110001 2000100211
01000

asiaticus[1]

0112210110 2012100220 1216021011 0020000000
0001001001 0111131010 1110000000 0000000000
7000000000 0120213000 1200110001 2000100211
01000

asiaticus[2]

0112200110 2012100220 1216021011 0020000000
0001001001 0111131010 1110000000 0000000000
7000000000 0120212000 1200110001 2000100211
01000

asiaticus[3]

0112210110 2012100220 1216021011 0020000000
0001001001 0111131010 1110000000 0000000000
7000000000 0120203000 1200110001 2000100211
01000

asiaticus[4]

0112200110 2012100220 1216021011 0020000000
0001001001 0111131010 1110000000 0000000000
7000000000 0120202000 1200110001 2000100211
01000

asiaticus[5]

0112210110 2012100220 1216021011 0020000000

0001000001 0111131010 1110000000 0000000000
7000000000 0120213000 1200110001 2000100211
01000

asiaticus[6]

0112200110 2012100220 1216021011 0020000000
0001000001 0111131010 1110000000 0000000000
7000000000 0120203000 1200110001 2000100211
01000

asiaticus[7]

0112210110 2012100220 1216021011 0020000000
0001000001 0111131010 1110000000 0000000000
7000000000 0120203000 1200110001 2000100211
01000

asiaticus[8]

0112200110 2012100220 1216021011 0020000000
0001001001 0111131010 1110000000 0000000000
7000000000 0120202000 1200110001 2000100211
01000

asiaticus[9]

0112210110 2012100220 1216021011 0020000000
0001000001 0111131010 1110000000 0000000000
7000000000 0120202000 1200110001 2000100211
01000

asiaticus[10]

0112200110 2012100220 1216021011 0020000000
0001001001 0111131010 1110000000 0000000000
7000000000 0120213000 1200110001 2000100211
01000

asiaticus[11]

0112210110 2012100220 1216021011 0020000000
0001000001 0111131010 1110000000 0000000000
7000000000 0120213000 1200110001 2000100211
01000

asiaticus[12]

0 1 1 2 2 1 0 1 1 0 2 0 1 2 1 0 0 2 2 0 1 2 1 6 0 2 1 0 1 1 0 0 2 0 0 0 0 0 0 0
0 0 0 1 0 0 0 0 0 0 1 0 1 1 1 1 3 1 0 1 0 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
7 0 0 0 0 0 0 0 0 0 0 0 1 2 0 2 1 3 0 0 0 1 2 0 0 1 1 0 0 0 1 2 0 0 0 1 0 0 2 1 1
0 1 0 0 0

asiaticus[13]

0 1 1 2 2 1 0 1 1 0 2 0 1 2 1 0 0 2 2 0 1 2 1 6 0 2 1 0 1 1 0 0 2 0 0 0 0 0 0 0
0 0 0 1 0 0 0 0 0 0 1 0 1 1 1 1 3 1 0 1 0 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
7 0 0 0 0 0 0 0 0 0 0 0 1 2 0 2 1 2 0 0 0 1 2 0 0 1 1 0 0 0 1 2 0 0 0 1 0 0 2 1 1
0 1 0 0 0

asiaticus[14]

0 1 1 2 2 1 0 1 1 0 2 0 1 2 1 0 0 2 2 0 1 2 1 6 0 2 1 0 1 1 0 0 2 0 0 0 0 0 0 0
0 0 0 1 0 0 1 0 0 1 0 0 1 0 1 1 1 1 3 1 0 1 0 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
7 0 0 0 0 0 0 0 0 0 0 0 1 2 0 2 0 3 0 0 0 1 2 0 0 1 1 0 0 0 1 2 0 0 0 1 0 0 2 1 1
0 1 0 0 0

asiaticus[15]

0 1 1 2 2 0 0 1 1 0 2 0 1 2 1 0 0 2 2 0 1 2 1 6 0 2 1 0 1 1 0 0 2 0 0 0 0 0 0 0
0 0 0 1 0 0 1 0 0 1 0 0 1 0 1 1 1 1 3 1 0 1 0 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
7 0 0 0 0 0 0 0 0 0 0 0 1 2 0 2 1 2 0 0 0 1 2 0 0 1 1 0 0 0 1 2 0 0 0 1 0 0 2 1 1
0 1 0 0 0

asiaticus[16]

0 1 1 2 2 0 0 1 1 0 2 0 1 2 1 0 0 2 2 0 1 2 1 6 0 2 1 0 1 1 0 0 2 0 0 0 0 0 0 0
0 0 0 1 0 0 1 0 0 1 0 0 1 0 1 1 1 1 3 1 0 1 0 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
7 0 0 0 0 0 0 0 0 0 0 0 1 2 0 2 1 2 0 0 0 1 2 0 0 1 1 0 0 0 1 2 0 0 0 1 0 0 2 1 1
0 1 0 0 0

asiaticus[17]

0 1 1 2 2 0 0 1 1 0 2 0 1 2 1 0 0 2 2 0 1 2 1 6 0 2 1 0 1 1 0 0 2 0 0 0 0 0 0 0
0 0 0 1 0 0 0 0 0 0 1 0 1 1 1 1 3 1 0 1 0 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
7 0 0 0 0 0 0 0 0 0 0 0 1 2 0 2 0 2 0 0 0 1 2 0 0 1 1 0 0 0 1 2 0 0 0 1 0 0 2 1 1
0 1 0 0 0

bactrianus

0 1 1 1 2 0 0 1 1 0 2 0 1 2 1 0 0 2 2 0 1 2 2 9 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 1 1 0 0 1 0 0 1 0 1 0 1 0 1 0 0 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

8 0 0 2 0 0 0 2 0 0 1 1 2 2 4 2 3 0 0 0 0 0 2 2 2 1 0 0 0 1 4 0 0 0 1 0 0 1 1 1
0 0 1 0 0

beludzhistanus (holotype)

0 1 1 2 2 2 0 1 2 0 2 0 1 2 1 0 0 2 2 0 1 1 1 6 0 2 1 0 1 1 0 0 1 0 0 0 0 0 0 0
0 0 0 2 1 1 1 0 0 1 2 3 1 1 2 3 1 0 1 0 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 1 1 2 0 3 2 3 0 0 0 0 0 2 2 2 1 0 0 0 1 4 0 0 0 1 0 0 1 1 1
0 1 0 0 0

brothersi (holotype)

0 1 1 2 2 0 0 0 1 2 1 2 0 2 2 0 0 1 1 0 0 0 1 1 1 0 0 0 0 0 2 0 0 1 0 0 1 1 0 0 1
0 0 0 0 0 0 0 1 0 1 0 1 0 0 1 3 0 0 1 1 1 2 1 0 0 0 1 1 0 0 0 0 0 0 0 1 0 0 0
4 0 0 2 0 0 1 0 0 0 2 0 1 1 2 2 2 2 0 0 0 2 1 1 0 0 0 0 0 3 5 0 0 0 1 0 1 0 1 1
0 0 1 0 0

brothersi (paratype)[1]

0 1 1 2 2 0 0 0 1 2 1 2 0 2 2 0 0 1 1 0 0 0 1 1 1 0 0 0 0 0 2 0 0 1 0 0 1 1 0 0 1
0 0 0 0 0 0 0 1 0 1 0 1 0 0 1 3 0 0 1 1 1 2 2 0 0 0 1 1 0 0 0 0 0 0 0 1 0 0 0
4 0 0 2 0 0 1 0 0 0 2 0 1 1 2 2 2 2 0 0 0 2 0 0 0 0 0 0 0 3 5 0 0 0 1 0 1 0 1 1
0 0 1 0 0

brothersi (paratype)[2]

0 1 1 2 2 0 0 0 1 2 1 2 0 2 2 0 0 1 1 0 0 0 1 1 1 0 0 0 0 0 2 0 0 1 0 0 1 1 0 0 1
0 0 0 0 0 0 0 1 0 1 0 1 0 0 1 3 0 0 1 1 1 2 2 0 0 0 1 1 0 0 0 0 0 0 0 1 0 0 0
4 0 0 2 0 0 1 0 0 0 2 0 1 1 2 2 2 2 0 0 0 2 1 1 0 0 0 0 0 3 5 0 0 0 1 0 1 0 1 1
0 0 1 0 0

brothersi (paratype)[3]

0 1 1 2 2 0 0 0 1 2 1 2 0 2 2 0 0 0 1 0 0 0 1 1 1 0 0 0 0 0 2 0 0 1 0 0 1 1 0 0 1
0 0 0 0 0 0 0 0 0 0 1 0 1 0 0 1 3 0 0 1 1 1 2 2 0 0 0 1 1 0 0 0 0 0 0 0 1 0 0 0
4 0 0 2 0 0 1 0 0 0 2 0 1 1 2 2 2 2 0 0 0 2 1 1 0 0 0 0 0 3 5 0 0 0 1 0 1 0 1 1
0 0 1 0 0

carinifer (reference specimen)

1 1 1 1 1 1 2 1 1 0 2 0 1 2 2 0 0 1 2 0 1 2 1 9 3 2 1 0 1 1 0 1 1 0 0 0 0 0 1 1
1 0 0 1 0 1 0 0 0 0 0 0 1 0 0 1 0 0 1 1 0 3 2 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 0 1 1 1 3 2 2 0 0 1 0 2 1 1 1 0 0 0 1 2 3 0 1 0 1 0 0 0 1 1

00000

carinifer[1]

1111112110 2012200120 1219321011 0110000011
1001010000 0010010011 0321000000 0000000000
1100000000000 0111322001 0211100012 3010100011
00000

carinifer[2]

1111112110 2012200120 1219321011 0110000011
1001010000 0010010011 0321000000 0000000000
1100000000000 0111322001 0211100012 3010100011
00000

carinifer[3]

1111112110 2012200120 1219321011 0110000011
1001010000 0010010011 0311000000 0000000000
1100000000000 0111322001 0211100012 3010100011
00000

carinifer[4]

1111112110 2012200120 1219321011 0110000011
1001010000 0010010011 0311000000 0000000000
1100000000000 0111322001 0211100012 3010100011
00000

carinifer[5]

1111112110 2012200120 1219321011 0110000011
1001010000 0010010011 0321000000 0000000000
1100000000000 0111322001 0211100012 3010100011
00000

carinifer[6]

1111112110 2012200120 1219321011 0110000011
1001010000 0010010011 0311000000 0000000000
1100000000000 0111322001 0211100012 3010100011
00000

carinifer[7]

1111112110 2012200120 1219321011 0110000011
1001010000 0010010011 0321000000 0000000000

11000000000 0111322001 0211100012 3010100011
00000

carinifer[8]

1111112110 2012200120 1219321011 0110000011
1001010000 0010010011 0311000000 0000000000
11000000000 0111322001 0211100012 3010100011
00000

carinifer[9]

1111112110 2012200120 1219321011 0110000011
1001010000 0010010011 0311000000 0000000000
11000000000 0111322001 0211100012 3010100011
00000

carinifer[10]

1111112110 2012200120 1219321011 0110000011
1001010000 0010010011 0321000000 0000000000
11000000000 0111322001 0211100012 3010100011
00000

carinifer[11]

1111112110 2012200120 1219321011 0110000011
1001010000 0010010011 0311000000 0000000000
11000000000 0111322001 0211100012 3010100011
00000

carinifer[12]

1111112110 2012200120 1219321011 0110000011
1001010000 0010010011 0321000000 0000000000
11000000000 0111322001 0211100012 3010100011
00000

carinifer[13]

1111112110 2012200120 1219321011 0110000011
1001010000 0010010011 0321000000 0000000000
11000000000 0111322001 0211100012 3010100011
00000

chloroticus[1]

0 1 1 1 2 2 0 1 1 0 2 0 1 2 2 0 0 2 2 0 1 2 2 9 0 2 1 0 1 0 0 0 0 0 0 0 0 0 1
0 0 1 2 1 0 0 0 0 0 1 0 0 1 3 0 0 1 0 0 0 0 0 0 0 0 0 0 1 1 0 0 0 1 0 0 0
1 2 0 1 0 0 0 0 2 1 0 2 0 1 0 1 2 2 0 0 0 0 0 1 1 2 1 0 0 1 1 2 3 0 0 2 0 0 0 1 1
0 0 0 0 0

chloroticus[2]

0 1 1 1 2 2 0 1 1 0 2 0 1 2 2 0 0 2 2 0 1 2 2 9 0 2 1 0 1 0 0 0 0 0 0 0 0 0 1
0 0 1 2 0 0 0 0 0 0 0 1 0 0 1 3 0 0 1 0 0 1 0 0 0 0 0 0 0 0 0 1 1 0 0 0 1 0 0 0
1 2 0 1 0 0 0 0 2 1 0 2 0 1 2 2 0 0 0 1 1 2 1 0 0 1 1 2 3 0 0 2 0 0 0 1 1
0 0 0 0 0

concavus (holotype)

0 1 1 1 2 2 0 1 1 0 2 0 1 1 1 0 0 1 2 0 1 1 1 3 3 2 1 0 1 1 0 1 1 0 0 0 0 0 1
0 0 0 2 0 1 0 0 0 1 0 1 1 0 2 3 0 0 0 0 0 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 1 2 1 3 1 2 0 0 0 0 2 1 1 2 1 0 0 0 0 0 1 0 1 2 Q 1 0 0 0
1 0 0 0 1

concavus (paratype)[1]

0 1 1 1 2 2 0 1 1 0 2 0 1 1 1 0 0 1 2 0 1 1 1 3 3 2 1 0 1 1 0 1 1 0 0 0 0 0 1
0 0 0 2 0 1 0 0 0 1 0 1 1 0 2 3 0 0 0 0 0 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 1 2 1 3 1 2 0 0 0 0 2 1 1 2 1 0 0 0 0 0 1 0 1 2 0 1 0 0 0
1 0 0 0 1

concavus (paratype)[2]

0 1 1 1 2 2 0 1 1 1 2 1 1 1 1 0 0 1 2 0 1 1 1 3 3 2 1 0 1 1 0 1 1 0 0 0 0 0 1
0 0 0 2 0 1 0 0 0 1 0 1 1 0 2 3 0 0 0 0 0 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 1 2 1 3 1 2 0 0 0 0 2 0 1 1 1 0 0 0 0 0 1 0 1 2 0 1 0 0 0
1 0 0 0 1

concavus (paratype)[3]

0 1 1 1 2 2 0 1 1 0 2 0 1 1 1 0 0 1 2 0 1 1 1 3 3 2 1 0 1 1 0 1 1 0 0 0 0 0 1
0 0 0 2 0 1 0 0 0 1 0 1 1 0 2 3 0 0 0 0 0 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 1 2 1 3 1 2 0 0 0 0 2 1 1 2 1 0 0 0 0 0 1 0 1 2 0 1 0 0 0
1 0 0 0 1

concavus (paratype)[4]

0 1 1 1 2 2 0 1 1 1 2 1 1 1 1 0 0 1 2 0 1 1 1 3 3 2 1 0 1 1 0 1 1 0 0 0 0 0 1
0 0 0 2 0 1 0 0 0 1 0 1 1 0 2 3 0 0 0 0 0 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0

8 0 0 0 0 0 0 0 0 0 0 0 1 2 0 3 1 2 0 0 0 0 2 0 1 1 1 0 0 0 0 0 1 0 1 2 0 1 0 0 0 1 0 0 0 1

concavus (paratype)[5]

0 1 1 1 2 2 0 1 1 1 2 1 1 1 1 0 0 1 2 0 1 1 1 3 3 2 1 0 1 1 0 1 1 0 0 0 0 0 1 0 0 0 2 0 1 0 0 0 1 0 1 1 0 2 3 0 0 0 0 0 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 8 0 0 0 0 0 0 0 0 0 0 0 1 2 1 3 1 2 0 0 0 0 2 0 1 1 1 0 0 0 0 0 1 0 1 2 0 1 0 0 0 1 0 0 0 1

concavus (paratype)[6]

0 1 1 1 2 2 0 1 1 0 2 0 1 1 1 1 0 0 1 2 0 1 1 1 3 3 2 1 0 1 1 0 1 1 0 0 0 0 0 1 0 0 0 2 0 1 0 0 0 1 0 1 1 0 2 3 0 0 0 0 0 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 8 0 0 0 0 0 0 0 0 0 0 0 1 2 1 3 1 2 0 0 0 0 2 1 1 2 1 0 0 0 0 0 1 0 1 2 0 1 0 0 0 1 0 0 0 1

concavus (paratype)[7]

0 1 1 1 2 2 0 1 1 0 2 0 1 1 1 1 0 0 1 2 0 1 1 1 3 3 2 1 0 1 1 0 1 1 0 0 0 0 0 1 0 0 0 2 0 1 0 0 0 1 0 1 1 0 2 3 0 0 0 0 0 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 8 0 0 0 0 0 0 0 0 0 0 0 1 2 0 3 1 2 0 0 0 0 2 1 1 2 1 0 0 0 0 0 1 0 1 2 0 1 0 0 0 1 0 0 0 1

concavus (paratype)[8]

0 1 1 1 2 2 0 1 1 0 2 0 1 1 1 1 0 0 1 2 0 1 1 1 3 3 2 1 0 1 1 0 1 1 0 0 0 0 0 1 0 0 0 2 0 1 0 0 0 1 0 1 1 0 2 3 0 0 0 0 0 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 8 0 0 0 0 0 0 0 0 0 0 0 1 2 0 3 1 2 0 0 0 0 2 1 1 2 1 0 0 0 0 0 1 0 1 2 0 1 0 0 0 1 0 0 0 1

concavus (paratype)[9]

0 1 1 1 2 2 0 1 1 0 2 0 1 1 1 1 0 0 1 2 0 1 1 1 3 3 2 1 0 1 1 0 1 1 0 0 0 0 0 1 0 0 0 2 0 1 0 0 0 1 0 1 1 0 2 3 0 0 0 0 0 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 8 0 0 0 0 0 0 0 0 0 0 0 1 2 1 3 1 2 0 0 0 0 2 1 1 2 1 0 0 0 0 0 1 0 1 2 0 1 0 0 0 1 0 0 0 1

concavus (paratype)[10]

0 1 1 1 2 2 0 1 1 0 2 0 1 1 1 1 0 0 1 2 0 1 1 1 3 3 2 1 0 1 1 0 1 1 0 0 0 0 0 1 0 0 0 2 0 1 0 0 0 1 0 1 1 0 2 3 0 0 0 0 0 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 8 0 0 0 0 0 0 0 0 0 0 0 1 2 1 3 1 2 0 0 0 0 2 0 1 1 1 0 0 0 0 0 1 0 1 2 0 1 0 0 0 1 0 0 0 1

convexus (holotype)

1 1 1 2 1 1 2 1 0 0 2 0 1 0 1 0 0 2 2 0 1 2 1 9 3 2 1 0 1 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 2 3 1 0 1 1 0 2 1 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 3 1 3 0 0 0 0 2 1 1 1 0 0 0 0 2 0 0 2 0 1 0 0 2 0 1 0 0 0 0 1

convexus (paratype)[1]

1 1 1 2 1 1 2 1 0 0 2 0 1 0 1 0 0 2 2 0 1 2 1 9 3 2 1 0 1 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 2 3 1 0 1 1 0 2 1 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 3 1 3 0 0 0 0 2 1 1 1 0 0 0 0 2 0 0 2 0 1 0 0 2 0 1 0 0 0 0 1

convexus (paratype)[2]

1 1 1 2 1 1 2 1 0 0 2 0 1 0 1 0 0 2 2 0 1 2 1 9 3 2 1 0 1 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 2 3 1 0 1 1 0 2 1 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 3 1 3 0 0 0 0 2 1 1 1 0 0 0 0 2 0 0 2 0 1 0 0 2 0 1 0 0 0 0 1

convexus (paratype)[3]

1 1 1 2 1 1 2 1 0 0 2 0 1 0 1 0 0 2 2 0 1 2 1 9 3 2 1 0 1 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 2 3 1 0 1 1 0 2 1 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 3 1 3 0 0 0 0 2 1 1 1 0 0 0 0 2 0 0 2 0 1 0 0 2 0 1 0 0 0 0 1

convexus (paratype)[4]

1 1 1 2 1 1 2 1 0 0 2 0 1 0 1 0 0 2 2 0 1 2 1 9 3 2 1 0 1 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 2 3 1 0 1 1 0 2 1 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 3 1 3 0 0 0 0 2 1 1 1 0 0 0 0 2 0 0 2 0 1 0 0 2 0 1 0 0 0 0 1

convexus (paratype)[5]

1 1 1 2 1 1 2 1 0 0 2 0 1 0 1 0 0 2 2 0 1 2 1 9 3 2 1 0 1 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 2 3 1 0 1 1 0 2 1 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 3 1 3 0 0 0 0 2 1 1 1 0 0 0 0 2 0 0 2 0 1 0 0 2 0 1 0 0 0 0 1

convexus (paratype)[6]

1 1 1 2 1 1 2 1 0 0 2 0 1 0 1 0 0 2 2 0 1 2 1 9 3 2 1 0 1 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 2 3 1 0 1 1 0 2 1 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 3 1 3 0 0 0 0 2 1 1 1 0 0 0 0 2 0 0 2 0 1 0 0 2 0 1

00001

convexus (paratype)[7]

1112112100 2010100220 1219321011 0110000000
0000000000 0110231011 0210000000 0000001000
0000000000 0111313000 0211100002 0020100201
00001

convexus (paratype)[8]

1112112100 2010100220 1219321011 0110000000
0000000000 0110231011 0210000000 0000001000
0000000000 0111313000 0211100002 0020100201
00001

convexus (paratype)[9]

1112112100 2010100220 1219321011 0110000000
0000000000 0110231011 0210000000 0000001000
0000000000 0111313000 0211100002 0020100201
00001

convexus (paratype)[10]

1112112100 2010100220 1219321011 0110000000
0000000000 0110231011 0210000000 0000001000
0000000000 0111313000 0211100002 0020100201
00001

convexus (paratype)[11]

1112112100 2010100220 1219321011 0110000000
0000000000 0110231011 0210000000 0000001000
0000000000 0111313000 0211100002 0020100201
00001

convexus (paratype)[12]

1112112100 2010100220 1219321011 0110000000
0000000000 0110231011 0210000000 0000001000
0000000000 0111313000 0211100002 0020100201
00001

convexus (paratype)[13]

1112112100 2010100220 1219321011 0110000000
0000000000 0110231011 0210000000 0000001000

0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 3 1 3 0 0 0 0 2 1 1 1 0 0 0 0 2 0 0 2 0 1 0 0 2 0 1 0 0 0 0 1

convexus (paratype)[14]

1 1 1 2 1 1 2 1 0 0 2 0 1 0 1 0 0 2 2 0 1 2 1 9 3 2 1 0 1 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 2 3 1 0 1 1 0 2 1 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 3 1 3 0 0 0 0 2 1 1 1 0 0 0 0 2 0 0 2 0 1 0 0 2 0 1 0 0 0 0 1

convexus (paratype)[15]

1 1 1 2 1 1 2 1 0 0 2 0 1 0 1 0 0 2 2 0 1 2 1 9 3 2 1 0 1 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 2 3 1 0 1 1 0 2 1 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 3 1 3 0 0 0 0 2 1 1 1 0 0 0 0 2 0 0 2 0 1 0 0 2 0 1 0 0 0 0 1

convexus (paratype)[16]

1 1 1 2 1 1 2 1 0 0 2 0 1 0 1 0 0 2 2 0 1 2 1 9 3 2 1 0 1 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 2 3 1 0 1 1 0 2 1 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 3 1 3 0 0 0 0 2 1 1 1 0 0 0 0 2 0 0 2 0 1 0 0 2 0 1 0 0 0 0 1

convexus (paratype)[17]

1 1 1 2 1 1 2 1 0 0 2 0 1 0 1 0 0 2 2 0 1 2 1 9 3 2 1 0 1 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 2 3 1 0 1 1 0 2 1 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 3 1 3 0 0 0 0 2 1 1 1 0 0 0 0 2 0 0 2 0 1 0 0 2 0 1 0 0 0 0 1

convexus (paratype)[18]

1 1 1 2 1 1 2 1 0 0 2 0 1 0 1 0 0 2 2 0 1 2 1 9 3 2 1 0 1 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 2 3 1 0 1 1 0 2 1 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 3 1 3 0 0 0 0 2 1 1 1 0 0 0 0 2 0 0 2 0 1 0 0 2 0 1 0 0 0 0 1

convexus (paratype)[19]

1 1 1 2 1 1 2 1 0 0 2 0 1 0 1 0 0 2 2 0 1 2 1 9 3 2 1 0 1 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 2 3 1 0 1 1 0 2 1 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 3 1 3 0 0 0 0 2 1 1 1 0 0 0 0 2 0 0 2 0 1 0 0 2 0 1 0 0 0 0 1

denticulatus (holotype)

0 1 1 1 0 0 0 1 1 1 2 2 1 1 1 0 1 1 1 0 0 1 1 3 3 2 1 0 1 1 0 1 1 0 1 0 0 0 0 0
0 1 0 1 0 1 0 1 1 0 2 2 1 2 1 4 1 2 1 1 0 3 2 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 0 1 1 3 1 3 0 0 0 0 0 1 1 1 0 0 0 0 0 0 0 1 2 0 1 0 0 0
1 0 0 0 0

denticulatus (paratype)

0 1 1 1 0 0 0 1 1 1 2 2 1 1 1 0 1 1 1 0 0 1 1 3 3 2 1 0 1 1 0 1 1 0 1 0 0 0 0 0
0 1 0 1 0 1 0 1 1 0 2 2 1 2 1 4 1 2 1 1 0 3 2 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 0 1 1 3 1 3 0 0 0 0 0 1 1 1 0 0 0 0 0 0 0 1 2 0 1 0 0 0
1 0 0 0 0

denticulatus (paratype)

0 1 1 1 0 0 0 1 1 1 2 2 1 1 1 0 1 1 1 0 0 1 1 3 3 2 1 0 1 1 0 1 1 0 1 0 0 0 0 0
0 1 0 1 0 1 0 1 1 0 2 2 1 2 1 4 1 2 1 1 0 3 2 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 0 1 1 3 1 3 0 0 0 0 0 1 1 1 0 0 0 0 0 0 0 1 2 0 1 0 0 0
1 0 0 0 0

denticulatus (paratype)

0 1 1 1 0 0 0 1 1 1 2 2 1 1 1 0 1 1 1 0 0 1 1 3 3 2 1 0 1 1 0 1 1 0 1 0 0 0 0 0
0 1 0 1 0 1 0 1 1 0 2 2 1 2 1 4 1 2 1 1 0 3 2 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 0 1 1 3 1 3 0 0 0 0 0 1 1 1 0 0 0 0 0 0 0 1 2 0 1 0 0 0
1 0 0 0 0

disgregus (holotype)

0 1 1 0 1 0 0 2 0 2 2 2 1 1 1 1 0 0 1 0 0 1 1 0 4 3 2 0 2 1 0 1 1 1 0 0 0 1 0 1
2 0 0 1 0 0 0 0 0 0 2 2 1 1 0 1 0 0 1 1 1 0 0 1 1 0 0 0 1 0 0 0 1 0 0 1 0 0 0
1 1 1 0 0 0 0 0 0 0 0 0 0 1 2 1 3 1 2 0 0 0 0 0 1 0 0 1 0 1 2 1 1 0 0 1 0 1 0 0 0
1 0 0 2 1

disgregus (paratype)[1]

0 1 1 0 1 0 0 2 0 2 2 2 1 1 1 1 0 1 1 0 0 1 1 0 4 3 2 0 2 1 0 1 1 1 0 0 0 1 0 1
2 0 0 1 0 0 0 0 0 0 2 2 1 1 0 1 0 0 1 1 1 0 0 1 1 0 0 0 1 0 0 0 1 0 0 1 0 0 0

11 1 0 0 0 0 0 0 0 0 0 0 0 1 2 1 3 1 2 0 0 0 0 0 0 1 0 0 1 0 1 2 1 1 0 0 1 0 1 0 0 0 1 0 0 2 1

disgregus (paratype)[2]

0 1 1 0 1 0 0 2 0 2 2 2 1 1 1 1 0 1 1 0 0 1 1 0 4 3 2 0 2 1 0 1 1 1 0 0 0 1 0 1 2 0 0 1 0 0 0 0 0 0 2 2 1 1 0 1 0 0 1 1 1 0 0 1 1 0 0 0 1 0 0 0 1 0 0 1 0 0 0 11 1 0 0 0 0 0 0 0 0 0 0 0 1 2 1 3 1 2 0 0 0 0 0 0 1 0 0 1 0 1 2 1 1 0 0 1 0 1 0 0 0 1 0 0 2 1

disgregus (paratype)[3]

0 1 1 0 1 0 0 2 0 2 2 2 1 1 1 1 0 1 1 0 0 0 1 0 4 3 2 0 2 1 0 1 1 1 0 0 0 1 0 1 2 0 0 1 0 0 0 0 0 0 2 2 1 1 0 1 0 0 1 1 1 0 0 1 1 0 0 0 1 0 0 0 1 0 0 1 0 0 0 11 1 0 0 0 0 0 0 0 0 0 0 0 1 2 1 3 1 2 0 0 0 0 0 0 1 0 0 0 1 0 0 1 0 1 1 1 1 0 0 1 0 1 0 0 0 1 0 0 2 1

disgregus (paratype)[4]

0 1 1 0 1 0 0 2 0 2 1 2 0 1 1 1 0 1 1 0 0 0 1 0 4 3 2 0 2 1 0 1 1 1 0 0 0 1 0 1 2 0 0 1 0 0 0 0 0 0 2 2 1 1 0 1 0 0 1 1 1 0 0 1 1 0 0 0 1 0 0 0 1 0 0 1 0 0 0 11 1 0 0 0 0 0 0 0 0 0 0 0 0 1 2 1 3 1 2 0 0 0 0 0 0 1 0 0 1 0 0 1 0 1 2 1 1 0 0 1 0 1 0 0 0 1 0 0 2 1

disgregus (paratype)[5]

0 1 1 0 1 0 0 2 0 2 1 2 0 1 1 1 0 0 1 0 0 1 1 0 4 3 2 0 2 1 0 1 1 1 0 0 0 1 0 1 2 0 0 1 0 0 0 0 0 0 2 2 1 1 0 1 0 0 1 1 1 0 0 1 1 0 0 0 1 0 0 0 1 0 0 1 0 0 0 11 1 0 0 0 0 0 0 0 0 0 0 0 1 2 1 3 1 2 0 0 0 0 0 0 1 0 0 0 1 0 0 1 0 1 2 1 1 0 0 1 0 1 0 0 0 1 0 0 2 1

femoralis (holotype)

0 1 1 2 2 2 0 1 1 0 2 0 1 2 2 2 0 0 2 2 0 1 1 1 9 2 2 1 0 1 1 0 0 0 0 0 0 0 0 0 1 0 0 0 1 0 0 0 0 0 1 1 2 0 0 1 3 0 0 1 1 0 2 2 1 0 0 0 0 0 2 0 1 0 0 0 0 0 1 5 0 1 0 0 0 0 0 0 0 0 1 0 1 0 1 0 2 0 0 0 0 2 0 1 0 0 0 0 0 1 3 3 0 0 2 0 0 1 1 1 0 0 0 0 0

femoralis (paratype)[1]

0 1 1 2 2 2 0 1 1 0 2 0 1 2 2 2 0 0 2 2 0 1 1 1 9 2 2 1 0 1 1 0 0 0 0 0 0 0 0 0 1 0 0 0 1 0 0 0 0 0 1 0 2 0 0 1 3 0 0 1 1 0 2 2 1 0 0 0 0 0 2 0 1 0 0 0 0 0 1 5 0 1 0 0 0 0 0 0 0 0 1 1 1 0 1 0 2 0 0 0 0 2 0 1 0 0 0 0 0 1 3 3 0 0 2 0 0 1 1 1 0 0 0 0 0

femoralis (paratype)[2]

0 1 1 2 2 2 0 1 1 0 2 0 1 2 2 2 0 0 2 2 0 1 1 2 9 2 2 1 0 1 1 0 0 0 0 0 0 0 0 1
0 0 0 1 0 0 0 0 0 1 1 2 0 0 1 3 0 0 1 1 0 2 2 1 0 0 0 0 0 2 0 1 0 0 0 0 0 0 0 0
5 0 1 0 0 0 0 0 0 0 1 1 1 0 1 0 2 0 0 0 0 2 0 1 0 0 0 0 0 1 3 3 0 0 2 0 0 1 1 1
0 0 0 0 0

femoralis (paratype)[3]

0 1 1 2 2 2 0 1 1 0 2 0 1 2 2 0 0 2 2 0 1 0 1 9 2 2 1 0 1 1 0 0 0 0 0 0 0 0 1
0 0 0 1 0 0 0 0 0 1 1 2 0 0 1 3 0 0 1 1 0 2 2 1 0 0 0 0 0 2 0 1 0 0 0 0 0 0 0 0
5 0 1 0 0 0 0 0 0 0 1 0 1 0 1 0 2 0 0 0 0 2 0 1 0 0 0 0 0 1 3 3 0 0 2 0 0 1 1 1
0 0 0 0 0

femoralis (paratype)[4]

0 1 1 2 2 2 0 1 1 0 2 0 1 2 2 0 0 2 2 0 1 1 1 9 2 2 1 0 1 1 0 0 0 0 0 0 0 0 1
0 0 0 1 0 0 0 0 0 1 1 2 0 0 1 3 0 0 1 1 0 2 2 1 0 0 0 0 0 2 0 1 0 0 0 0 0 0 0 0
5 0 1 0 0 0 0 0 0 0 1 0 1 0 1 0 2 0 0 0 0 2 0 1 0 0 0 0 0 1 3 3 0 0 2 0 0 1 1 1
0 0 0 0 0

ferrugineus (holotype)

0 1 1 1 2 0 0 1 1 0 2 0 1 1 1 0 0 2 2 1 1 2 2 6 0 2 1 0 1 1 0 0 1 0 0 0 0 0 0 1
1 0 0 1 0 1 1 0 0 0 1 1 0 0 0 0 1 0 0 1 0 1 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 1 0 0 0 0 0 0 0 0 1 2 0 2 1 3 0 0 0 1 2 0 0 1 0 0 0 1 1 2 0 0 0 1 1 2 1 1 1
0 0 1 0 0

garamantis (holotype)

0 1 1 1 2 2 2 2 1 1 2 2 1 2 1 0 0 2 2 0 1 2 1 9 0 2 1 0 1 1 0 0 1 0 0 0 0 0 0 1
0 0 0 2 0 1 0 0 0 0 0 1 1 0 0 1 0 0 1 0 1 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 0 1 1 3 2 3 0 0 0 0 0 2 2 2 1 0 0 0 1 0 0 0 0 1 0 0 1 1 0
0 0 0 0 0

garamantis[1]

0 1 1 1 2 2 2 2 1 1 2 2 1 2 1 0 0 2 2 0 1 2 1 9 0 2 1 0 1 1 0 0 1 0 0 0 0 0 0 1
0 0 0 2 0 1 0 0 0 0 0 1 1 0 0 1 0 0 1 0 1 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 0 1 1 3 2 3 0 0 0 0 0 2 2 2 1 0 0 0 1 0 0 0 0 1 0 0 1 1 0
0 0 0 0 0

garamantis[2]

0 1 1 1 2 2 2 2 1 1 2 2 1 2 1 0 0 2 2 0 1 2 1 9 0 2 1 0 1 1 0 0 1 0 0 0 0 0 0 1

0 0 0 1 0 0 0 0 0 0 0 1 1 0 0 0 1 0 0 1 0 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 8 0 0 0 0 0 0 0 0 0 0 0 0 1 1 3 2 3 0 0 0 0 0 2 2 2 1 0 0 0 1 0 0 0 0 1 0 0 1 1 0 0 0 0 0

garamantis[3]

0 1 1 1 2 2 2 2 1 1 2 2 1 2 1 0 0 2 2 0 1 2 1 9 0 2 1 0 1 1 0 0 1 0 0 0 0 0 0 1 0 0 0 2 0 1 0 0 0 0 1 1 0 0 0 1 0 0 1 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 8 0 0 0 0 0 0 0 0 0 0 0 0 1 1 3 2 3 0 0 0 0 0 2 2 2 1 0 0 0 1 0 0 0 0 1 0 0 1 1 0 0 0 0 0

garamantis[4]

0 1 1 1 2 2 2 2 1 1 2 2 1 2 1 0 0 2 2 0 1 2 1 9 0 2 1 0 1 1 0 0 1 0 0 0 0 0 0 1 0 0 0 1 0 0 0 0 0 0 1 1 0 0 1 0 0 1 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 8 0 0 0 0 0 0 0 0 0 0 0 0 1 1 3 2 3 0 0 0 0 0 2 2 2 1 0 0 0 1 0 0 0 0 1 0 0 1 1 0 0 0 0 0

garamantis[5]

0 1 1 1 2 2 2 2 1 1 2 2 1 2 1 0 0 2 2 0 1 2 1 9 0 2 1 0 1 1 0 0 1 0 0 0 0 0 0 1 0 0 0 2 0 1 0 0 0 0 1 1 0 0 1 0 0 1 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 8 0 0 0 0 0 0 0 0 0 0 0 0 1 1 3 2 3 0 0 0 0 0 2 2 2 1 0 0 0 1 0 0 0 0 1 0 0 1 1 0 0 0 0 0

garamantis[6]

0 1 1 1 2 2 2 2 1 1 2 2 1 2 1 0 0 2 2 0 1 2 1 9 0 2 1 0 1 1 0 0 1 0 0 0 0 0 0 1 0 0 0 2 0 1 0 0 0 0 1 1 0 0 1 0 0 1 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 8 0 0 0 0 0 0 0 0 0 0 0 0 1 1 3 2 3 0 0 0 0 0 2 2 2 1 0 0 0 1 0 0 0 0 1 0 0 1 1 0 0 0 0 0

garamantis[7]

0 1 1 1 2 2 2 2 1 1 2 2 1 2 1 0 0 2 2 0 1 2 1 9 0 2 1 0 1 1 0 0 1 0 0 0 0 0 0 1 0 0 0 2 0 1 0 0 0 0 1 1 0 0 1 0 0 1 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 8 0 0 0 0 0 0 0 0 0 0 0 0 1 1 3 2 3 0 0 0 0 0 2 2 2 1 0 0 0 1 0 0 0 0 1 0 0 1 1 0 0 0 0 0

imbellis[1]

0 1 1 1 2 0 0 1 1 0 2 0 1 1 1 0 0 2 2 0 1 2 1 2 3 2 1 0 1 1 0 1 1 0 0 0 0 0 1 0 0 0 2 0 1 0 1 0 0 0 0 0 2 0 1 0 0 1 0 0 0 2 0 1 0 0 1 0 1 0 1 0 2 0 0 0 0 0 0 0 0 1 0 0 0 0 8 0 0 0 0 0 0 0 0 0 0 0 0 0 1 2 2 4 2 3 0 0 0 0 0 1 1 2 1 0 0 2 0 1 0 1 2 0 1 0 0 1 0 1 2 0 0 0 1 0 0 0 0

1 0 0 0 0

imbellis[2]

0 1 1 1 2 0 0 1 1 0 2 0 1 1 1 0 0 2 2 0 1 2 1 2 3 2 1 0 1 1 0 1 1 0 0 0 0 0 1
0 0 0 2 0 1 0 1 0 0 0 0 0 2 0 1 0 0 1 0 0 1 0 1 0 2 0 0 0 0 0 0 0 0 0 1 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 1 2 2 4 2 3 0 0 0 0 0 1 2 2 1 0 0 2 0 0 1 0 1 2 0 1 0 0 0
1 0 0 0 0

imbellis[3]

0 1 1 1 2 0 0 1 1 0 2 0 1 1 1 0 0 2 2 0 1 2 1 2 3 2 1 0 1 1 0 1 1 0 0 0 0 0 1
0 0 0 2 0 1 0 1 0 0 0 0 0 2 0 1 0 0 1 0 0 1 0 1 0 2 0 0 0 0 0 0 0 0 0 1 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 1 2 2 3 2 2 0 0 0 0 0 1 2 2 1 0 0 2 0 0 1 0 1 2 0 1 0 0 0
1 0 0 0 0

imbellis[4]

0 1 1 1 2 0 0 1 1 0 2 0 1 1 1 0 0 2 2 0 1 2 1 2 3 2 1 0 1 1 0 1 1 0 0 0 0 0 1
0 0 0 2 0 1 0 1 0 0 0 0 0 2 0 1 0 0 1 0 0 1 1 1 0 2 0 0 0 0 0 0 0 0 0 1 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 1 2 2 4 2 3 0 0 0 0 0 1 1 2 1 0 0 2 0 0 1 0 1 2 0 1 0 0 0
1 0 0 0 0

imbellis[5]

0 1 1 1 2 0 0 1 1 0 2 0 1 1 1 0 0 2 2 0 1 2 1 2 3 2 1 0 1 1 0 1 1 0 0 0 0 0 1
0 0 0 1 0 1 0 0 0 0 0 0 0 2 0 1 0 0 1 0 0 1 1 1 0 2 0 0 0 0 0 0 0 0 0 1 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 1 2 2 4 2 3 0 0 0 0 0 1 2 2 1 0 0 2 0 0 1 0 1 2 0 1 0 0 0
1 0 0 0 0

imbellis[6]

0 1 1 1 2 0 0 1 1 0 2 0 1 1 1 0 0 2 2 0 1 2 1 2 3 2 1 0 1 1 0 1 1 0 0 0 0 0 1
0 0 0 2 0 1 0 1 0 0 0 0 0 2 0 1 0 0 1 0 0 1 0 1 0 2 0 0 0 0 0 0 0 0 0 1 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 1 2 2 4 2 3 0 0 0 0 0 1 2 2 1 0 0 2 0 0 1 0 1 2 0 1 0 0 0
1 0 0 0 0

imbellis[7]

0 1 1 1 2 0 0 1 1 0 2 0 1 1 1 0 0 2 2 0 1 2 1 2 3 2 1 0 1 1 0 1 1 0 0 0 0 0 1
0 0 0 1 0 1 0 0 0 0 0 0 0 2 0 1 0 0 1 0 0 1 0 1 0 2 0 0 0 0 0 0 0 0 0 1 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 1 2 2 4 2 3 0 0 0 0 0 1 1 2 1 0 0 2 0 0 1 0 1 2 0 1 0 0 0
1 0 0 0 0

imbellis[8]

0 1 1 1 2 0 0 1 1 0 2 0 1 1 1 0 0 2 2 0 1 2 1 2 3 2 1 0 1 1 0 1 1 0 0 0 0 0 1
0 0 0 1 0 1 0 0 0 0 0 0 0 2 0 1 0 0 1 0 0 1 0 1 0 2 0 0 0 0 0 0 0 0 0 1 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 1 2 2 3 2 2 0 0 0 0 0 1 1 2 1 0 0 2 0 0 1 0 1 2 0 1 0 0 0

10000

imbellis[9]

0111200110 2011100220 1212321011 0110000001
0002010100 0002010010 0101020000 0000010000
8000000000 0122322000 0011210020 0101201000
10000

imbellis[10]

0111200110 2011100220 1212321011 0110000001
0002010100 0002010010 0111020000 0000010000
8000000000 0122322000 0011210020 0101201000
10000

imbellis[11]

0111200110 2011100220 1212321011 0110000001
0002010100 0002010010 0101020000 0000010000
8000000000 0122423000 0012210020 0101201000
10000

imbellis[12]

0111200110 2011100220 1212321011 0110000001
0001010000 0002010010 0111020000 0000010000
8000000000 0122322000 0012210020 0101201000
10000

imbellis[13]

0111200110 2011100220 1212321011 0110000001
0002010100 0002010010 0101020000 0000010000
8000000000 0122423000 0012210020 0101201000
10000

imbellis[14]

0111200110 2011100220 1212321011 0110000001
0002010100 0002010010 0111020000 0000010000
8000000000 0122322000 0012210020 0101201000
10000

imbellis[15]

0111200110 2011100220 1212321011 0110000001
0002010100 0002010010 0111020000 0000010000

8 0 0 0 0 0 0 0 0 0 0 0 1 2 2 4 2 3 0 0 0 0 0 1 2 2 1 0 0 2 0 0 1 2 0 1 2 0 1 0 0 0
1 0 0 0 0

imbellis[16]

0 1 1 1 2 0 0 1 1 0 2 0 1 1 1 0 0 2 2 0 1 2 1 2 3 2 1 0 1 1 0 1 1 0 0 0 0 0 1
0 0 0 2 0 1 0 1 0 0 0 0 0 2 0 1 0 0 1 0 0 1 1 1 0 2 0 0 0 0 0 0 0 0 1 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 1 2 2 4 2 3 0 0 0 0 0 1 1 2 1 0 0 2 0 0 1 2 0 1 2 0 1 0 0 0
1 0 0 0 0

imbellis[17]

0 1 1 1 2 0 0 1 1 0 2 0 1 1 1 0 0 2 2 0 1 2 1 2 3 2 1 0 1 1 0 1 1 0 0 0 0 0 1
0 0 0 2 0 1 0 1 0 0 0 0 0 2 0 1 0 0 1 0 0 1 0 1 0 2 0 0 0 0 0 0 0 0 1 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 1 2 2 4 2 3 0 0 0 0 0 1 2 2 1 0 0 2 0 0 1 2 0 1 2 0 1 0 0 0
1 0 0 0 0

imbellis[18]

0 1 1 1 2 0 0 1 1 0 2 0 1 1 1 0 0 2 2 0 1 2 1 2 3 2 1 0 1 1 0 1 1 0 0 0 0 0 1
0 0 0 2 0 1 0 1 0 0 0 0 0 2 0 1 0 0 1 0 0 1 0 1 0 2 0 0 0 0 0 0 0 0 1 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 1 2 2 4 2 3 0 0 0 0 0 1 2 2 1 0 0 2 0 0 1 2 0 1 2 0 1 0 0 0
1 0 0 0 0

imbellis[19]

0 1 1 1 2 0 0 1 1 0 2 0 1 1 1 0 0 2 2 0 1 2 1 2 3 2 1 0 1 1 0 1 1 0 0 0 0 0 1
0 0 0 2 0 1 0 1 0 0 0 0 0 2 0 1 0 0 1 0 0 1 0 1 0 2 0 0 0 0 0 0 0 0 1 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 1 2 2 4 2 3 0 0 0 0 0 1 2 2 1 0 0 2 0 0 1 2 0 1 2 0 1 0 0 0
1 0 0 0 0

semele (lectotype)

0 1 1 1 2 0 0 1 1 0 2 0 1 1 1 0 0 2 2 0 1 2 1 2 3 2 1 0 1 1 0 1 1 0 0 0 0 0 1
0 0 0 2 0 1 0 0 0 0 0 0 0 2 0 1 0 0 1 0 0 1 1 1 0 2 0 0 0 0 0 0 0 0 1 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 1 2 2 3 2 2 0 0 0 0 0 1 1 2 1 0 0 2 0 0 1 2 0 1 2 0 1 0 0 0
1 0 0 0 0

semele (paralectotype)[1]

0 1 1 1 2 0 0 1 1 0 2 0 1 1 1 0 0 2 2 0 1 2 1 2 3 2 1 0 1 1 0 1 1 0 0 0 0 0 1
0 0 0 1 0 1 0 0 0 0 0 0 0 2 0 1 0 0 1 0 0 1 0 1 0 2 0 0 0 0 0 0 0 0 1 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 1 2 2 4 2 3 0 0 0 0 0 1 2 2 1 0 0 2 0 0 1 2 0 1 2 0 1 0 0 0
1 0 0 0 0

semele (paralectotype)[2]

0 1 1 1 2 0 0 1 1 0 2 0 1 1 1 0 0 2 2 0 1 2 1 2 3 2 1 0 1 1 0 1 1 0 0 0 0 0 1

0 0 0 1 0 1 0 1 0 0 0 0 0 2 0 1 0 0 1 0 0 1 0 1 0 2 0 0 0 0 0 0 0 0 0 1 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 1 2 2 4 2 3 0 0 0 0 0 1 2 2 2 1 0 0 2 0 0 1 0 1 2 0 1 0 0 0
1 0 0 0 0

semele (paralectotype)[3]

0 1 1 1 2 0 0 1 1 0 2 0 1 1 1 0 0 2 2 0 1 2 1 2 3 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 2 0 1 0 1 0 0 0 0 0 2 0 1 0 0 1 0 0 1 0 1 0 2 0 0 0 0 0 0 0 0 0 1 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 1 2 2 3 2 2 0 0 0 0 0 1 2 2 2 1 0 0 2 0 0 1 0 1 2 0 1 0 0 0
1 0 0 0 0

semele (paralectotype)[4]

0 1 1 1 2 0 0 1 1 0 2 0 1 1 1 0 0 2 2 0 1 2 1 2 3 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 2 0 1 0 1 0 0 0 0 0 2 0 1 0 0 1 0 0 1 0 1 0 2 0 0 0 0 0 0 0 0 0 1 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 1 2 2 4 2 3 0 0 0 0 0 1 2 2 2 1 0 0 2 0 0 1 0 1 2 0 1 0 0 0
1 0 0 0 0

indistinctus (holotype)

0 0 1 2 2 2 0 2 2 0 2 0 1 2 1 0 0 2 2 0 1 2 2 8 0 2 1 0 1 0 0 0 2 0 0 0 0 0 0 1
0 0 0 1 0 1 1 0 0 0 0 1 1 0 0 1 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 0 1 0 1 1 3 2 3 0 0 0 0 2 1 1 2 1 0 0 0 0 1 0 1 1 2 0 3 1 1 1
0 0 0 0 0

indistinctus (paratype)[1]

0 0 1 2 2 2 0 2 2 0 2 0 1 2 1 0 0 2 2 0 1 2 2 8 0 2 1 0 1 0 0 0 2 0 0 0 0 0 0 1
0 0 0 1 0 1 1 0 0 0 0 1 1 0 0 1 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 0 1 0 1 1 3 2 3 0 0 0 0 2 1 1 2 1 0 0 0 0 1 0 1 1 2 0 3 1 1 1
0 0 0 0 0

indistinctus (paratype)[2]

0 0 1 2 2 2 0 2 2 0 2 0 1 2 1 0 0 2 2 0 1 2 2 8 0 2 1 0 1 0 0 0 2 0 0 0 0 0 0 1
0 0 0 1 0 0 1 0 0 0 0 1 1 0 0 1 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 0 1 0 1 1 3 2 3 0 0 0 0 2 1 1 1 1 0 0 0 0 0 1 0 1 1 2 0 3 1 1 1
0 0 0 0 0

indistinctus (paratype)[3]

0 0 1 2 2 2 0 2 2 0 2 0 1 2 1 0 0 2 2 0 1 2 1 8 0 2 1 0 1 0 0 0 2 0 0 0 0 0 0 1
0 0 0 1 0 1 1 0 0 0 0 1 1 0 0 1 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 0 1 0 1 1 3 2 3 0 0 0 0 2 1 1 2 1 0 0 0 0 1 0 1 1 2 0 3 1 1 1
0 0 0 0 0

indistinctus (paratype)[4]

0 0 1 2 2 2 0 2 2 0 2 0 1 2 1 0 0 2 2 0 1 2 2 8 0 2 1 0 1 0 0 0 2 0 0 0 0 0 0 1
0 0 0 1 0 1 1 0 0 0 0 1 1 0 0 1 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 1 0 1 1 3 2 3 0 0 0 0 2 1 1 2 1 0 0 0 0 1 0 1 1 2 0 3 1 1 1
0 0 0 0 0

inornatus (holotype)

0 1 1 2 2 2 0 1 1 0 2 0 1 1 2 0 0 1 2 1 1 2 1 5 3 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 1 0 1 0 0 0 1 0 0 0 0 1 0 0 0 0 1 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 1 0 1 2 4 2 3 0 0 0 0 0 0 0 0 2 1 0 0 1 0 3 2 0 1 2 0 1 0 0 0
1 0 0 0 0

inornatus (paratype)[1]

0 1 1 2 2 2 0 1 1 0 2 0 1 1 2 0 0 1 2 1 1 2 1 5 3 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 1 0 1 0 0 0 1 0 0 0 0 1 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 1 0 1 2 4 2 3 0 0 0 0 0 0 0 2 0 0 0 1 0 3 2 0 1 2 0 1 0 0 0
1 0 0 0 0

inornatus (paratype)[2]

0 1 1 2 2 2 0 1 1 0 2 0 1 1 2 0 0 1 2 1 1 2 1 5 3 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 0 0 0 0 0 0 1 0 0 0 0 1 0 0 0 0 1 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 1 0 1 2 4 2 3 0 0 0 0 0 0 1 0 2 1 0 0 1 0 3 2 0 1 2 0 1 0 0 0
1 0 0 0 0

inornatus (paratype)[3]

0 1 1 2 2 2 0 1 1 1 2 1 1 1 2 0 0 1 2 1 1 2 1 5 3 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 1 0 1 0 0 0 1 0 0 0 0 1 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 1 0 1 2 4 2 3 0 0 0 0 0 0 1 0 2 1 0 0 1 0 3 2 0 1 2 0 1 0 0 0
1 0 0 0 0

inornatus (paratype)[4]

0 1 1 2 2 2 0 1 1 1 2 1 1 1 2 0 0 1 2 1 1 2 1 5 3 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 0 0 0 0 0 0 1 0 0 0 0 1 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 1 0 1 2 4 2 3 0 0 0 0 0 0 1 0 2 1 0 0 1 0 3 2 0 1 2 0 1 0 0 0
1 0 0 0 0

inornatus (paratype)[5]

0 1 1 2 2 2 0 1 1 0 2 0 1 1 2 0 0 1 2 1 1 2 1 5 3 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 0 0 0 0 0 0 1 0 0 0 0 1 0 0 0 0 1 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0

11 0 0 0 0 0 0 0 0 0 0 0 1 0 1 2 4 2 3 0 0 0 0 0 0 0 0 2 1 0 0 1 0 3 2 0 1 2 0 1 0 0 0 1 0 0 0 0

inornatus (paratype)[6]

0 1 1 2 2 2 0 1 1 0 2 0 1 1 2 0 0 1 2 1 1 2 1 5 3 2 1 0 1 1 0 1 1 0 0 0 0 0 1 0 0 0 1 0 1 0 1 0 0 0 1 0 0 0 0 1 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 11 0 0 0 0 0 0 0 0 0 0 0 1 0 1 2 4 2 3 0 0 0 0 0 1 0 2 1 0 0 1 0 3 2 0 1 2 0 1 0 0 0 1 0 0 0 0

lividus (holotype)

0 1 1 2 2 2 0 1 0 0 2 0 1 1 1 0 0 1 2 1 1 1 1 3 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 0 2 1 1 1 0 0 0 1 1 0 0 0 0 1 0 0 0 0 0 1 1 1 0 1 0 0 0 0 0 0 0 0 0 0 11 0 0 0 0 0 0 0 0 0 0 0 0 0 1 2 4 2 3 0 0 0 0 0 1 1 2 1 0 0 0 2 0 1 0 1 2 0 1 0 0 0 1 0 0 1 1

lividus[1]

0 1 1 2 2 2 0 1 0 0 2 0 1 1 1 0 0 1 2 1 1 1 1 3 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 0 2 1 1 1 0 0 0 1 1 0 0 0 0 1 0 0 0 0 0 1 1 1 0 1 0 0 0 0 0 0 0 0 0 0 11 0 0 0 0 0 0 0 0 0 0 0 0 0 1 2 4 2 3 0 0 0 0 0 1 1 2 1 0 0 0 2 0 1 0 1 2 0 1 0 0 0 1 0 0 1 1

lividus[2]

0 1 1 2 2 2 0 1 0 0 2 0 1 1 1 0 0 1 2 1 1 1 1 3 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 0 2 1 1 1 0 0 0 1 1 0 0 0 0 1 0 0 0 0 0 1 1 1 0 1 0 0 0 0 0 0 0 0 0 0 11 0 0 0 0 0 0 0 0 0 0 0 0 0 1 2 4 2 3 0 0 0 0 0 1 1 2 1 0 0 0 2 0 1 0 1 2 0 1 0 0 0 1 0 0 1 1

lividus[3]

0 1 1 2 2 2 0 1 0 0 2 0 1 1 1 0 0 1 2 1 1 1 1 3 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 0 2 1 1 1 0 0 0 1 1 0 0 0 0 1 0 0 0 0 0 1 1 1 0 1 0 0 0 0 0 0 0 0 0 0 11 0 0 0 0 0 0 0 0 0 0 0 0 0 1 2 4 2 3 0 0 0 0 0 1 1 2 1 0 0 0 1 0 1 0 1 2 0 1 0 0 0 1 0 0 1 1

lividus[4]

0 1 1 2 2 2 0 1 0 0 2 0 1 1 1 0 0 1 2 1 1 1 1 3 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 0 2 0 1 1 0 0 0 1 1 0 0 0 0 1 0 0 0 0 0 1 1 1 0 1 0 0 0 0 0 0 0 0 0 0 11 0 0 0 0 0 0 0 0 0 0 0 0 0 1 2 4 2 3 0 0 0 0 0 1 1 2 1 0 0 0 2 0 1 0 1 2 0 1 0 0 0 1 0 0 1 1

lividus[5]

0 1 1 2 2 2 0 1 0 0 2 0 1 1 1 0 0 1 2 1 1 1 1 3 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 0 0 2 0 1 1 0 0 0 1 0 0 0 0 1 0 0 0 0 1 0 1 1 1 0 1 0 0 0 0 0 0 0 0 0 8 0 0 0 0 0 0 0 0 0 0 0 1 2 4 2 3 0 0 0 0 0 1 1 2 1 0 0 0 1 0 1 0 1 2 0 1 0 0 0 1 0 0 1 1

lividus[6]

0 1 1 2 2 2 0 1 0 0 2 0 1 1 1 0 0 1 2 1 1 1 1 3 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 0 0 2 0 1 1 0 0 0 1 0 0 0 0 1 0 1 1 1 0 1 0 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 1 2 4 2 3 0 0 0 0 0 1 1 2 1 0 0 0 2 0 1 0 1 2 0 1 0 0 0 1 0 0 1 1

lividus[7]

0 1 1 2 2 2 0 1 0 0 2 0 1 1 1 0 0 1 2 1 1 1 1 3 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 0 0 2 1 1 1 0 0 0 1 1 0 0 0 0 1 0 1 1 1 0 1 0 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 1 2 4 2 3 0 0 0 0 0 1 1 2 1 0 0 0 2 0 1 0 1 2 0 1 0 0 0 1 0 0 1 1

lividus[8]

0 1 1 2 2 2 0 1 0 0 2 0 1 1 1 0 0 1 2 1 1 1 1 3 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 0 0 2 1 1 1 0 0 0 1 0 0 0 0 1 0 1 1 1 0 1 0 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 1 2 4 2 3 0 0 0 0 0 1 1 2 1 0 0 0 2 0 1 0 1 2 0 1 0 0 0 1 0 0 1 1

lividus[9]

0 1 1 2 2 2 0 1 0 0 2 0 1 1 1 0 0 1 2 1 1 1 1 3 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 0 0 2 1 1 1 0 0 0 1 0 0 0 0 1 0 1 1 1 0 1 0 0 0 0 0 0 0 0 0 8 0 0 0 0 0 0 0 0 0 0 0 1 2 4 2 3 0 0 0 0 0 1 1 2 1 0 0 0 1 0 1 0 1 2 0 1 0 0 0 1 0 0 1 1

lividus[10]

0 1 1 2 2 2 0 1 0 0 2 0 1 1 1 0 0 1 2 1 1 1 1 3 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 0 0 2 0 1 1 0 0 0 1 0 0 0 0 1 0 1 1 1 0 1 0 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 1 2 4 2 3 0 0 0 0 0 1 1 2 1 0 0 0 1 0 1 0 1 2 0 1 0 0 0 1 0 0 1 1

lividus[11]

0 1 1 2 2 2 0 1 0 0 2 0 1 1 1 0 0 1 2 1 1 1 1 3 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 0 0 2 1 1 1 0 0 0 1 1 0 0 0 0 1 0 1 1 1 0 1 0 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 1 2 4 2 3 0 0 0 0 0 1 1 2 1 0 0 0 2 0 1 0 1 2 0 1 0 0 0

1 0 0 1 1

lividus[12]

0 1 1 2 2 2 0 1 0 0 2 0 1 1 1 1 0 0 1 2 1 1 1 3 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 0 0 0 2 0 1 1 0 0 0 1 1 0 0 0 0 1 0 0 0 0 0 1 1 1 0 1 0 0 0 0 0 0 0 0 0 0 0 8 0 0 0 0 0 0 0 0 0 0 0 0 1 2 4 2 3 0 0 0 0 1 1 2 1 0 0 0 2 0 1 0 1 2 0 1 0 0 0

1 0 0 1 1

lividus[13]

0 1 1 2 2 2 0 1 0 0 2 0 1 1 1 0 0 1 2 1 1 1 3 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 0 0 0 2 1 1 1 0 0 0 1 1 0 0 0 1 0 0 0 0 0 1 1 1 0 1 0 0 0 0 0 0 0 0 0 0 0 11 0 0 0 0 0 0 0 0 0 0 0 0 1 2 4 2 3 0 0 0 0 1 1 2 1 0 0 0 1 0 1 0 1 2 0 1 0 0 0

1 0 0 1 1

lividus[14]

0 1 1 2 2 2 0 1 0 0 2 0 1 1 1 0 0 1 2 1 1 1 3 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 0 0 0 2 1 1 1 0 0 0 1 1 0 0 0 1 0 0 0 0 0 1 1 1 0 1 0 0 0 0 0 0 0 0 0 0 0 11 0 0 0 0 0 0 0 0 0 0 0 0 1 2 4 2 3 0 0 0 0 1 1 2 1 0 0 0 2 0 1 0 1 2 0 1 0 0 0

1 0 0 1 1

lividus[15]

0 1 1 2 2 2 0 1 0 0 2 0 1 1 1 0 0 1 2 1 1 1 3 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 0 0 0 2 1 1 1 0 0 0 1 1 0 0 0 1 0 0 0 0 0 1 1 1 0 1 0 0 0 0 0 0 0 0 0 0 0 11 0 0 0 0 0 0 0 0 0 0 0 0 1 2 4 2 3 0 0 0 0 1 1 2 1 0 0 0 2 0 1 0 1 2 0 1 0 0 0

1 0 0 1 1

lividus[16]

0 1 1 2 2 2 0 1 0 0 2 0 1 1 1 0 0 1 2 1 1 1 3 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 0 0 0 2 1 1 1 0 0 0 1 1 0 0 0 1 0 0 0 0 0 1 1 1 0 1 0 0 0 0 0 0 0 0 0 0 0 11 0 0 0 0 0 0 0 0 0 0 0 0 1 2 4 2 3 0 0 0 0 1 1 2 1 0 0 0 2 0 1 0 1 2 0 1 0 0 0

1 0 0 1 1

longicarinatus (holotype)

0 1 1 2 2 1 1 1 1 0 2 1 0 2 2 0 0 2 2 0 1 2 1 9 3 2 1 0 1 1 0 1 1 0 0 0 0 0 1 1 0 0 1 0 0 0 0 0 0 0 1 1 2 4 1 0 1 1 0 3 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 9 0 0 0 0 0 0 0 0 0 0 0 2 3 1 3 1 3 0 0 1 0 3 2 1 2 0 0 0 0 2 2 0 0 0 1 0 0 1 1 1 0 0 0 0 1

longicarinatus (paratype)[1]

0 1 1 2 2 1 1 1 1 0 2 1 0 2 2 0 0 2 2 0 1 2 1 9 3 2 1 0 1 1 0 1 1 0 0 0 0 0 1

1 0 0 1 0 0 0 0 0 0 0 0 1 1 2 4 1 0 1 1 0 3 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 9 0 0 0 0 0 0 0 0 0 0 0 2 3 1 3 1 3 0 0 1 0 3 2 1 2 0 0 0 0 2 2 0 0 0 1 0 0 1 1 1 0 0 0 0 1

longicarinatus (paratype)[2]

0 1 1 2 2 1 1 1 1 0 2 1 0 2 2 0 0 2 2 0 1 2 1 9 3 2 1 0 1 1 0 1 1 0 0 0 0 0 1 1 1 0 0 1 0 0 0 0 0 0 0 1 1 2 4 1 0 1 1 0 3 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 9 0 0 0 0 0 0 0 0 0 0 0 2 3 1 3 1 3 0 0 1 0 3 1 1 1 0 0 0 0 2 2 0 0 0 1 0 0 1 1 1 0 0 0 0 1

longicarinatus (paratype)[3]

0 1 1 2 2 1 1 1 1 0 2 1 0 2 2 0 0 2 2 0 1 2 1 9 3 2 1 0 1 1 0 1 1 0 0 0 0 0 1 1 1 0 0 1 0 0 0 0 0 0 0 1 1 2 4 1 0 1 1 0 3 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 9 0 0 0 0 0 0 0 0 0 0 0 2 3 1 3 1 3 0 0 1 0 3 2 1 2 0 0 0 0 2 2 0 0 0 1 0 0 1 1 1 0 0 0 0 1

luridus (holotype)

0 1 1 1 2 2 0 1 2 0 2 0 1 2 1 0 0 2 2 0 1 2 2 7 0 2 1 0 1 1 0 0 1 0 0 0 0 0 0 1 0 0 0 2 1 1 1 0 0 0 1 2 1 1 1 0 0 0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 1 3 1 0 0 0 0 2 1 1 2 1 0 0 0 1 4 0 1 0 2 0 0 1 1 1 0 0 1 1 0

luridus (paratype)[1]

0 1 1 1 2 2 0 1 2 0 2 0 1 2 1 0 0 2 2 0 1 2 2 7 0 2 1 0 1 1 0 0 1 0 0 0 0 0 0 1 0 0 0 2 1 1 1 0 0 0 1 2 1 1 1 0 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 1 3 1 0 0 0 0 2 1 1 2 1 0 0 0 1 4 0 1 0 2 0 0 1 1 1 0 0 1 1 0

luridus (paratype)[2]

0 1 1 1 2 2 0 1 2 0 2 0 1 2 1 0 0 2 2 0 1 2 2 7 0 2 1 0 1 1 0 0 1 0 0 0 0 0 0 1 0 0 0 1 0 1 1 0 0 0 1 2 1 1 1 0 0 0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 1 3 1 0 0 0 0 2 1 1 2 1 0 0 0 1 4 0 1 0 2 0 0 1 1 1 0 0 1 1 0

luridus (paratype)[3]

0 1 1 1 2 2 0 1 2 0 2 0 1 2 1 0 0 2 2 0 1 2 2 7 0 2 1 0 1 1 0 0 1 0 0 0 0 0 0 1 0 0 0 2 1 1 1 1 0 0 0 1 1 1 1 1 0 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 1 2 1 0 0 0 0 2 1 1 2 1 0 0 0 1 4 0 1 0 2 0 0 1 1 1 0 0 1 1 0

mandibularis[1]

0 1 1 1 1 0 0 0 0 1 2 1 1 1 1 0 0 1 2 0 1 1 1 1 2 0 0 0 1 1 1 1 0 2 0 0 0 0 0 0 0 0
1 0 0 1 0 0 1 0 0 0 0 0 0 0 1 1 3 1 0 1 1 0 3 2 0 0 0 0 0 0 2 1 0 1 0 1 0 1 0 0 0
9 0 0 1 0 0 0 1 0 0 1 1 2 0 2 2 2 1 0 0 1 2 0 0 1 1 0 0 0 2 4 0 0 0 1 0 0 1 1 1
0 0 1 1 1

mandibularis[2]

0 1 1 1 1 0 0 0 0 1 2 1 1 1 1 0 0 1 2 0 1 1 1 1 2 0 0 0 1 1 1 1 0 2 0 0 0 0 0 0 0 0
1 0 0 1 0 0 1 0 0 0 0 0 0 1 1 3 1 0 1 1 0 2 2 0 0 0 0 0 0 2 1 0 1 0 1 0 1 0 0 0
9 0 0 1 0 0 0 1 0 0 1 1 2 0 2 1 2 1 0 0 1 2 0 0 1 1 0 0 0 2 4 0 0 0 1 0 0 1 1 1
0 0 1 1 1

marmaricus (holotype)

1 0 0 2 0 0 0 1 1 0 2 0 1 2 2 0 0 2 2 1 1 1 1 4 0 2 1 0 1 1 0 0 1 0 0 0 0 0 0 0 0
0 0 0 2 0 0 0 0 1 0 1 1 0 1 0 1 0 0 1 0 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0
5 0 0 0 0 0 0 0 0 0 0 1 1 2 1 2 2 2 0 0 0 0 0 1 1 2 0 0 0 0 1 2 0 2 1 2 1 0 0 0 1
0 0 0 0 0

marmaricus[1]

1 0 0 2 0 0 0 1 1 0 2 0 1 2 2 0 0 2 2 1 1 1 1 4 0 2 1 0 1 1 0 0 1 0 0 0 0 0 0 0 0
0 0 0 2 0 0 0 0 1 0 1 1 0 1 0 1 0 0 1 0 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0
5 0 0 0 0 0 0 0 0 0 0 1 1 2 1 2 2 2 0 0 0 0 0 1 1 2 0 0 0 0 1 2 0 2 1 2 1 0 0 0 1
0 0 0 0 0

marmaricus[2]

1 0 0 2 0 0 0 1 1 0 2 0 1 2 2 0 0 2 2 1 1 1 1 4 0 2 1 0 1 1 0 0 1 0 0 0 0 0 0 0 0
0 0 0 2 0 0 0 0 1 0 1 1 0 1 0 1 0 0 1 0 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0
5 0 0 0 0 0 0 0 0 0 0 1 1 2 1 2 2 2 0 0 0 0 0 1 1 2 0 0 0 0 1 2 0 2 1 2 1 0 0 0 1
0 0 0 0 0

marmaricus[3]

1 0 0 2 0 0 0 1 1 0 2 0 1 2 2 0 0 2 2 1 1 1 1 4 0 2 1 0 1 1 0 0 1 0 0 0 0 0 0 0 0
0 0 0 2 0 0 0 0 1 0 1 1 0 1 0 1 0 0 1 0 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0
5 0 0 0 0 0 0 0 0 0 0 1 1 2 1 2 2 2 0 0 0 0 0 1 1 2 0 0 0 0 1 2 0 2 1 2 1 0 0 0 1
0 0 0 0 0

marmaricus[4]

1 0 0 2 0 0 0 1 1 0 2 0 1 2 2 0 0 2 2 1 1 1 1 4 0 2 1 0 1 1 0 0 1 0 0 0 0 0 0 0 0
0 0 0 2 0 0 0 0 1 0 1 1 0 1 0 1 0 0 1 0 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0

5 0 0 0 0 0 0 0 0 0 0 1 1 2 1 2 2 2 0 0 0 0 0 1 1 2 0 0 0 1 2 0 2 1 2 1 0 0 0 1
0 0 0 0 0

niloticus (holotype)

0 1 1 1 2 0 0 1 2 0 2 0 1 2 1 0 0 2 2 0 1 2 1 7 0 2 1 0 1 1 0 0 2 0 0 0 0 0 0 1
0 0 0 1 0 1 0 0 0 0 0 1 0 2 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 1 0 1 1 3 2 2 0 0 0 1 2 1 1 1 1 0 0 0 1 4 0 0 2 2 0 3 1 1 1
0 0 0 0 0

niloticus (paratype)[1]

0 1 1 1 2 0 0 1 2 0 2 0 1 2 1 0 0 2 2 0 1 2 1 7 0 2 1 0 1 1 0 0 2 0 0 0 0 0 0 1
0 0 0 1 0 1 0 0 0 0 0 1 0 2 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 1 0 1 1 3 2 2 0 0 0 1 2 1 1 1 1 0 0 0 2 4 0 0 2 2 0 3 1 1 1
0 0 0 0 0

niloticus (paratype)[2]

0 1 1 1 2 0 0 1 2 0 2 0 1 2 1 0 0 2 2 0 1 2 1 7 0 2 1 0 1 1 0 0 2 0 0 0 0 0 0 1
0 0 0 1 0 1 0 0 0 0 1 1 0 2 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 1 0 1 1 3 2 2 0 0 0 1 2 1 1 1 1 0 0 0 2 4 0 0 2 2 0 3 1 1 1
0 0 0 0 0

niloticus (paratype)[3]

0 1 1 1 2 0 0 1 2 0 2 0 1 2 1 0 0 2 2 0 1 2 1 7 0 2 1 0 1 1 0 0 2 0 0 0 0 0 0 1
0 0 0 1 0 1 0 0 0 0 0 1 0 2 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 1 0 1 1 3 2 2 0 0 0 1 2 1 1 1 1 0 0 0 1 4 0 0 2 2 0 3 1 1 1
0 0 0 0 0

niloticus (paratype)[4]

0 1 1 1 2 0 0 1 2 0 2 0 1 2 1 0 0 2 2 0 1 2 1 7 0 2 1 0 1 1 0 0 2 0 0 0 0 0 0 1
0 0 0 1 0 1 0 0 0 0 1 1 0 2 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 1 0 1 1 3 2 2 0 0 0 1 2 1 1 1 1 0 0 0 2 4 0 0 2 2 0 3 1 1 1
0 0 0 0 0

niloticus (paratype)[5]

0 1 1 1 2 0 0 1 2 0 2 0 1 2 1 0 0 2 2 0 1 2 1 7 0 2 1 0 1 1 0 0 2 0 0 0 0 0 0 1
0 0 0 1 0 1 0 0 0 0 1 1 0 2 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 1 0 1 1 3 2 2 0 0 0 1 2 1 1 1 1 0 0 0 2 4 0 0 2 2 0 3 1 1 1
0 0 0 0 0

niloticus (paratype)[6]

0 1 1 1 2 0 0 1 2 0 2 0 1 2 1 0 0 2 2 0 1 2 1 7 0 2 1 0 1 1 0 0 2 0 0 0 0 0 0 1
0 0 0 1 0 1 0 0 0 0 1 1 0 2 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 1 0 1 1 3 2 2 0 0 0 1 2 1 1 1 1 0 0 0 1 4 0 0 2 2 0 3 1 1 1
0 0 0 0 0

niloticus (paratype)[7]

0 1 1 1 2 0 0 1 2 0 2 0 1 2 1 0 0 2 2 0 1 2 1 7 0 2 1 0 1 1 0 0 2 0 0 0 0 0 0 1
0 0 0 1 0 1 0 0 0 0 1 1 0 2 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 1 0 1 1 3 2 2 0 0 0 1 2 1 1 1 1 0 0 0 1 4 0 0 2 2 0 3 1 1 1
0 0 0 0 0

niloticus (paratype)[8]

0 1 1 1 2 0 0 1 2 0 2 0 1 2 1 0 0 2 2 0 1 2 1 7 0 2 1 0 1 1 0 0 2 0 0 0 0 0 0 1
0 0 0 1 0 1 0 0 0 0 0 1 0 2 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 1 0 1 1 3 2 2 0 0 0 1 2 1 1 1 1 0 0 0 2 4 0 0 2 2 0 3 1 1 1
0 0 0 0 0

niloticus (paratype)[9]

0 1 1 1 2 0 0 1 2 0 2 0 1 2 1 0 0 2 2 0 1 2 1 7 0 2 1 0 1 1 0 0 2 0 0 0 0 0 0 1
0 0 0 1 0 1 0 0 0 0 0 1 0 2 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 1 0 1 1 3 2 2 0 0 0 1 2 1 1 1 1 0 0 0 2 4 0 0 2 2 0 3 1 1 1
0 0 0 0 0

niloticus[1]

0 1 1 1 2 0 0 1 2 0 2 0 1 2 1 0 0 2 2 0 1 2 1 7 0 2 1 0 1 1 0 0 2 0 0 0 0 0 0 1
0 0 0 1 0 1 0 0 0 0 1 1 0 2 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 1 0 1 1 3 2 2 0 0 0 1 2 1 1 1 1 0 0 0 2 4 0 0 2 2 0 3 1 1 1
0 0 0 0 0

niloticus[2]

0 1 1 1 2 0 0 1 2 0 2 0 1 2 1 0 0 2 2 0 1 2 1 7 0 2 1 0 1 1 0 0 2 0 0 0 0 0 0 1
0 0 0 1 0 1 0 0 0 0 0 1 0 2 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 1 0 1 1 3 2 2 0 0 0 1 2 1 1 1 1 0 0 0 2 4 0 0 2 2 0 3 1 1 1
0 0 0 0 0

niloticus[3]

0 1 1 1 2 0 0 1 2 0 2 0 1 2 1 0 0 2 2 0 1 2 1 7 0 2 1 0 1 1 0 0 2 0 0 0 0 0 0 1
0 0 0 1 0 1 0 0 0 0 1 1 0 2 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 1 0 1 1 3 2 2 0 0 0 1 2 1 1 1 1 0 0 0 1 4 0 0 2 2 0 3 1 1 1

0 0 0 0 0

niloticus[4]

0 1 1 1 2 0 0 1 2 0 2 0 1 2 1 0 0 2 2 0 1 2 1 7 0 2 1 0 1 1 0 0 2 0 0 0 0 0 0 1

0 0 0 1 0 1 0 0 0 0 1 1 0 2 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

8 0 0 0 0 0 0 0 0 0 0 1 0 1 1 3 2 2 0 0 0 1 2 1 1 1 1 0 0 0 2 4 0 0 2 2 0 3 1 1 1

0 0 0 0 0

niloticus[5]

0 1 1 1 2 0 0 1 2 0 2 0 1 2 1 0 0 2 2 0 1 2 1 7 0 2 1 0 1 1 0 0 2 0 0 0 0 0 0 1

0 0 0 1 0 1 0 0 0 0 0 1 0 2 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

8 0 0 0 0 0 0 0 0 0 1 0 1 1 3 2 2 0 0 0 1 2 1 1 1 1 0 0 0 2 4 0 0 2 2 0 3 1 1 1

0 0 0 0 0

nodosus (holotype)

0 1 1 1 0 0 0 1 1 1 1 0 0 1 0 1 2 1 0 0 2 1 8 3 2 1 0 1 1 0 1 1 0 1 0 0 0 0 0

0 1 0 2 0 1 0 1 1 0 2 2 0 0 0 1 0 0 0 0 0 3 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1 1 0 0 0 0 0 0 0 0 0 0 0 0 1 1 4 1 3 0 0 0 0 0 1 0 1 0 0 0 0 1 0 0 1 2 0 1 0 0 0

1 0 0 0 0

nodosus[1]

0 1 1 1 0 0 0 1 1 1 1 0 0 1 0 1 2 1 0 1 1 8 3 2 1 0 1 1 0 1 1 0 1 0 0 0 0 0

0 1 0 2 0 1 0 1 1 0 2 2 0 0 0 1 0 0 0 0 0 3 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1 1 0 0 0 0 0 0 0 0 0 0 0 0 1 1 4 1 3 0 0 0 0 0 1 0 1 0 0 0 0 1 0 0 1 2 0 1 0 0 0

1 0 0 0 0

nodosus[2]

0 1 1 1 0 0 0 1 1 1 1 0 0 1 0 1 2 1 0 2 1 8 3 2 1 0 1 1 0 1 1 0 1 0 0 0 0 0

0 1 0 2 0 1 0 1 1 0 2 2 0 0 0 1 0 0 0 0 0 3 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1 1 0 0 0 0 0 0 0 0 0 0 0 0 1 1 4 1 3 0 0 0 0 0 1 0 1 0 0 0 0 1 0 0 1 2 0 1 0 0 0

1 0 0 0 0

nodosus[3]

0 1 1 1 0 0 0 1 1 1 1 0 0 1 0 1 2 1 0 1 1 8 3 2 1 0 1 1 0 1 1 0 1 0 0 0 0 0

0 1 0 2 0 1 0 1 1 0 2 2 0 0 0 1 0 0 0 0 0 3 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1 1 0 0 0 0 0 0 0 0 0 0 0 0 1 1 4 1 3 0 0 0 0 0 1 0 1 0 0 0 0 1 0 0 1 2 0 1 0 0 0

1 0 0 0 0

nodosus[4]

0 1 1 1 0 0 0 1 1 1 1 0 0 1 0 1 2 1 0 2 1 8 3 2 1 0 1 1 0 1 1 0 1 0 0 0 0 0

0 1 0 2 0 1 0 1 1 0 2 2 0 0 0 1 0 0 0 0 0 4 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 3 1 3 0 0 0 0 0 0 0 1 0 1 0 0 0 0 1 0 0 1 2 0 1 0 0 0 1 0 0 0 0

nodosus[5]

0 1 1 1 0 0 0 1 1 1 1 0 0 1 0 1 2 1 0 0 2 1 8 3 2 1 0 1 1 0 1 1 0 1 0 0 0 0 0 0 1 0 2 0 1 0 1 1 0 2 2 0 0 0 1 0 0 0 0 0 3 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 4 1 3 0 0 0 0 0 0 0 1 0 1 0 0 0 0 1 0 0 1 2 0 1 0 0 0 1 0 0 0 0

nodosus[6]

0 1 1 1 0 0 0 1 1 1 1 0 0 1 0 1 2 1 0 0 2 1 8 3 2 1 0 1 1 0 1 1 0 1 0 0 0 0 0 0 1 0 2 0 1 0 1 1 0 2 2 0 0 0 1 0 0 0 0 0 4 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 4 1 3 0 0 0 0 0 0 0 1 0 1 0 0 0 0 1 0 0 1 2 0 1 0 0 0 1 0 0 0 0

nodosus[7]

0 1 1 1 0 0 0 1 1 1 1 0 0 1 0 1 2 1 0 0 2 1 8 3 2 1 0 1 1 0 1 1 0 1 0 0 0 0 0 0 1 0 2 0 1 0 1 1 0 2 2 0 0 0 1 0 0 0 0 0 4 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 4 1 3 0 0 0 0 0 0 0 1 0 1 0 0 0 0 1 0 0 1 2 0 1 0 0 0 1 0 0 0 0

nodosus[8]

0 1 1 1 0 0 0 1 1 1 1 0 0 1 0 1 2 1 0 0 2 1 8 3 2 1 0 1 1 0 1 1 0 1 0 0 0 0 0 0 1 0 2 0 1 0 1 1 0 2 2 0 0 0 1 0 0 0 0 0 4 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 4 1 3 0 0 0 0 0 0 0 1 0 1 0 0 0 0 1 0 0 1 2 0 1 0 0 0 1 0 0 0 0

nodosus[9]

0 1 1 1 0 0 0 1 1 1 1 0 0 1 0 1 2 1 0 0 1 1 8 3 2 1 0 1 1 0 1 1 0 1 0 0 0 0 0 0 1 0 2 0 1 0 1 1 0 2 2 0 0 0 1 0 0 0 0 0 3 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 4 1 3 0 0 0 0 0 0 0 1 0 1 0 0 0 0 1 0 0 1 2 0 1 0 0 0 1 0 0 0 0

nodosus[10]

0 1 1 1 0 0 0 1 1 1 1 0 0 1 0 1 2 1 0 0 1 1 8 3 2 1 0 1 1 0 1 1 0 1 0 0 0 0 0 0 1 0 2 0 1 0 1 1 0 2 2 0 0 0 1 0 0 0 0 0 3 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 3 1 3 0 0 0 0 0 0 0 1 0 1 0 0 0 0 1 0 0 1 2 0 1 0 0 0 1 0 0 0 0

nodosus[11]

0 1 1 1 0 0 0 1 1 1 1 1 0 0 1 0 1 2 1 0 0 2 1 8 3 2 1 0 1 1 0 1 1 0 1 0 0 0 0 0

0 1 0 2 0 1 0 1 1 0 2 2 0 0 0 1 0 0 0 0 0 3 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1 1 0 0 0 0 0 0 0 0 0 0 0 0 1 1 3 1 3 0 0 0 0 0 0 1 0 1 0 0 0 0 1 0 0 1 2 0 1 0 0 0

1 0 0 0 0

nodosus[12]

0 1 1 1 0 0 0 1 1 1 1 1 0 0 1 0 1 2 1 0 1 1 8 3 2 1 0 1 1 0 1 1 0 1 0 0 0 0 0

0 1 0 2 0 1 0 1 1 0 2 2 0 0 0 1 0 0 0 0 0 3 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1 1 0 0 0 0 0 0 0 0 0 0 0 0 1 1 3 1 3 0 0 0 0 0 0 1 0 1 0 0 0 0 1 0 0 1 2 0 1 0 0 0

1 0 0 0 0

nodosus[13]

0 1 1 1 0 0 0 1 1 1 1 1 0 0 1 0 1 2 1 0 0 2 1 8 3 2 1 0 1 1 0 1 1 0 1 0 0 0 0 0

0 1 0 2 0 1 0 1 1 0 2 2 0 0 0 1 0 0 0 0 0 3 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1 1 0 0 0 0 0 0 0 0 0 0 0 0 1 1 4 1 3 0 0 0 0 0 0 1 0 1 0 0 0 0 1 0 0 1 2 0 1 0 0 0

1 0 0 0 0

nodosus[14]

0 1 1 1 0 0 0 1 1 1 1 1 0 0 1 0 1 2 1 0 1 1 8 3 2 1 0 1 1 0 1 1 0 1 0 0 0 0 0

0 1 0 2 0 1 0 1 1 0 2 2 0 0 0 1 0 0 0 0 0 3 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1 1 0 0 0 0 0 0 0 0 0 0 0 0 1 1 4 1 3 0 0 0 0 0 0 1 0 1 0 0 0 0 1 0 0 1 2 0 1 0 0 0

1 0 0 0 0

nodosus[15]

0 1 1 1 0 0 0 1 1 1 1 1 0 0 1 0 1 2 1 0 1 1 8 3 2 1 0 1 1 0 1 1 0 1 0 0 0 0 0

0 1 0 2 0 1 0 1 1 0 2 2 0 0 0 1 0 0 0 0 0 4 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1 1 0 0 0 0 0 0 0 0 0 0 0 0 1 1 3 1 3 0 0 0 0 0 0 1 0 1 0 0 0 0 1 0 0 1 2 0 1 0 0 0

1 0 0 0 0

nodosus[16]

0 1 1 1 0 0 0 1 1 1 1 1 0 0 1 0 1 2 1 0 0 2 1 8 3 2 1 0 1 1 0 1 1 0 1 0 0 0 0 0

0 1 0 2 0 1 0 1 1 0 2 2 0 0 0 1 0 0 0 0 0 4 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1 1 0 0 0 0 0 0 0 0 0 0 0 0 1 1 4 1 3 0 0 0 0 0 0 1 0 1 0 0 0 0 1 0 0 1 2 0 1 0 0 0

1 0 0 0 0

nodosus[17]

0 1 1 1 0 0 0 1 1 1 1 1 0 0 1 0 1 2 1 0 0 2 1 8 3 2 1 0 1 1 0 1 1 0 1 0 0 0 0 0

0 1 0 2 0 1 0 1 1 0 2 2 0 0 0 1 0 0 0 0 0 3 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1 1 0 0 0 0 0 0 0 0 0 0 0 0 1 1 4 1 3 0 0 0 0 0 0 1 0 1 0 0 0 0 1 0 0 1 2 0 1 0 0 0

10000

nodosus[18]

0111000111 1100101210 0218321011 0110100000
0102010110 2200010000 0320000000 0000000000
1100000000 0011413000 0001010000 1001201000
10000

nodosus[19]

0111000111 1100101210 0218321011 0110100000
0102010110 2200010000 0320000000 0000000000
1100000000 0011313000 0001010000 1001201000
10000

nonveilleri (holotype)

0111200100 2012200220 1119121011 0010000000
0001010000 0110010011 0111000000 0000000001
2000000000 1011323200 0200100101 2010111011
00100

nonveilleri[1]

0111200100 2012200220 1119121011 0010000000
0001010000 0110010011 0111000000 0000000001
2000000000 1011323200 0200100101 2010111011
00100

nonveilleri[2]

0111200100 2012200220 1119121011 0010000000
0001010000 0110010011 0111000000 0000000001
2000000000 1011323200 0200100101 2010111011
00100

nonveilleri[3]

0111200100 2012200220 1119121011 0010000000
0001010000 0110010011 0111000000 0000000001
2000000000 1011323200 0200100101 2010111011
00100

nursei (paratype)

0 1 1 2 1 0 0 1 0 0 2 0 1 2 2 2 0 0 2 2 0 1 0 0 6 0 2 1 0 1 1 0 0 2 0 0 0 0 0 0 1
1 0 0 1 0 1 1 0 0 0 0 1 0 0 1 3 0 0 1 0 0 1 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
11 0 0 2 0 0 0 0 0 0 0 1 2 1 3 1 3 0 1 1 1 0 0 0 1 0 0 0 1 1 2 0 0 0 1 0 0 0 1 1
0 1 0 0 0

nursei[1]

0 1 1 2 1 0 0 1 0 0 2 0 1 2 2 0 0 2 2 0 1 1 1 6 0 2 1 0 1 1 0 0 2 0 0 0 0 0 0 1
1 0 0 1 0 1 1 0 0 0 0 1 0 0 1 3 0 0 1 0 0 1 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
11 0 0 2 0 0 0 0 0 0 0 1 2 0 3 1 2 0 1 1 1 0 0 0 1 0 0 1 1 2 0 0 0 1 0 0 1 1
0 1 0 0 0

nursei[2]

0 1 1 2 1 0 0 1 0 0 2 0 1 2 2 0 0 2 2 0 1 0 1 6 0 2 1 0 1 1 0 0 2 0 0 0 0 0 0 1
1 0 0 1 0 1 1 0 0 0 0 1 0 0 1 3 0 0 1 0 0 1 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
11 0 0 2 0 0 0 0 0 0 0 1 2 1 3 1 3 0 1 1 1 0 0 0 1 0 0 1 1 2 0 0 0 1 0 0 1 1
0 1 0 0 0

nursei[3]

0 1 1 2 1 0 0 1 0 0 2 0 1 2 2 0 0 2 2 0 1 1 0 6 0 2 1 0 1 1 0 0 2 0 0 0 0 0 0 1
1 0 0 1 0 1 1 0 0 0 0 1 0 0 1 3 0 0 1 0 0 1 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
11 0 0 2 0 0 0 0 0 0 0 1 2 0 3 1 2 0 1 1 1 0 0 0 1 0 0 1 1 2 0 0 0 1 0 0 1 1
0 1 0 0 0

nursei[4]

0 1 1 2 1 0 0 1 0 0 2 0 1 2 2 0 0 2 2 0 1 0 0 6 0 2 1 0 1 1 0 0 2 0 0 0 0 0 0 1
1 0 0 1 0 1 1 0 0 0 0 1 0 0 1 3 0 0 1 0 0 1 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
11 0 0 2 0 0 0 0 0 0 0 1 2 0 3 1 2 0 1 1 1 0 0 0 1 0 0 1 1 2 0 0 0 1 0 0 1 1
0 1 0 0 0

palaestinensis (holotype)

1 1 0 2 2 2 0 1 0 1 1 2 0 2 1 0 0 2 2 0 1 2 1 9 0 2 1 0 1 0 0 0 0 0 0 0 0 0 0 1
1 0 0 1 0 0 0 0 0 0 0 1 1 0 0 1 0 0 1 0 0 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
5 0 1 0 0 0 0 0 0 0 0 1 0 1 0 1 2 3 0 0 1 0 0 1 1 2 1 0 0 1 2 3 3 1 0 2 0 0 0 1 1
0 0 0 0 0

palaestinensis (paratype)[1]

1 1 0 2 2 2 0 1 0 1 1 2 0 2 1 0 0 2 2 0 1 2 1 9 0 2 1 0 1 0 0 0 0 0 0 0 0 0 0 1
1 0 0 2 0 1 0 0 0 0 1 1 0 0 1 0 0 1 0 0 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

5 0 1 0 0 0 0 0 0 0 1 0 1 0 1 2 3 0 0 1 0 0 1 1 2 1 0 0 1 2 3 3 1 0 2 0 0 0 1 1
0 0 0 0 0

pallidicornis (holotype)

0 1 1 2 2 2 0 1 1 0 2 0 1 2 1 0 0 1 2 0 1 1 1 7 0 2 1 0 1 1 0 0 1 0 0 0 0 0 0 1
0 0 0 2 0 0 0 0 0 1 0 1 0 0 0 1 0 0 1 0 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0
8 0 0 0 1 1 0 0 0 0 1 0 1 0 2 1 2 0 0 0 0 0 0 0 0 1 0 0 0 0 1 0 1 1 0 1 2 2 0 2 1 1 1
0 0 0 0 0

pallidicornis[1]

0 1 1 2 2 2 0 1 1 0 2 0 1 2 1 0 0 1 2 0 1 1 1 7 0 2 1 0 1 1 0 0 1 0 0 0 0 0 0 1
0 0 0 2 0 0 0 0 0 1 0 1 0 0 0 1 0 0 1 0 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0
8 0 0 0 1 1 0 0 0 0 1 0 1 0 2 1 2 0 0 0 0 0 0 0 0 1 0 0 0 0 1 0 1 1 0 1 2 2 0 2 1 1 1
0 0 0 0 0

pallidicornis[2]

0 1 1 2 2 2 0 1 1 0 2 0 1 2 1 0 0 1 2 0 1 1 1 7 0 2 1 0 1 1 0 0 1 0 0 0 0 0 0 1
0 0 0 2 0 0 0 0 0 1 0 1 0 0 0 1 0 0 1 0 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0
8 0 0 0 1 1 0 0 0 0 1 0 1 0 2 1 2 0 0 0 0 0 0 0 0 1 0 0 0 0 1 0 1 1 0 1 2 2 0 2 1 1 1
0 0 0 0 0

pallidicornis[3]

0 1 1 2 2 2 0 1 1 0 2 0 1 2 1 0 0 1 2 0 1 1 1 0 0 7 0 2 1 0 1 1 0 0 1 0 0 0 0 0 0 1
0 0 0 2 0 0 0 0 0 1 0 1 0 0 0 1 0 0 1 0 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0
8 0 0 0 1 1 0 0 0 0 1 0 1 0 2 1 2 0 0 0 0 0 0 0 0 1 0 0 0 0 1 0 1 1 0 1 2 2 0 2 1 1 1
0 0 0 0 0

pallidicornis[4]

0 1 1 2 2 2 0 1 1 0 2 0 1 2 1 0 0 1 2 0 1 1 1 0 0 7 0 2 1 0 1 1 0 0 1 0 0 0 0 0 0 1
0 0 0 2 0 0 0 0 0 1 0 1 0 0 0 1 0 0 1 0 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0
8 0 0 0 1 1 0 0 0 0 1 0 1 0 2 1 2 0 0 0 0 0 0 0 0 1 0 0 0 0 1 0 1 1 0 1 2 2 0 2 1 1 1
0 0 0 0 0

pallidicornis[5]

0 1 1 2 2 2 0 1 1 0 2 0 1 2 1 0 0 1 2 0 1 1 1 0 0 7 0 2 1 0 1 1 0 0 1 0 0 0 0 0 0 1
0 0 0 2 0 0 0 0 0 1 0 1 0 0 0 1 0 0 1 0 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0
8 0 0 0 1 1 0 0 0 0 1 0 1 0 2 1 2 0 0 0 0 0 0 0 0 1 0 0 0 0 1 0 1 1 0 1 2 2 0 2 1 1 1
0 0 0 0 0

pallidicornis[6]

0 1 1 2 2 2 0 1 1 0 2 0 1 2 1 0 0 1 2 0 1 0 0 7 0 2 1 0 1 1 0 0 1 0 0 0 0 0 0 1
0 0 0 2 0 0 0 0 0 1 0 1 0 0 0 0 1 0 0 1 0 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0
8 0 0 0 1 1 0 0 0 0 1 0 1 0 2 1 2 0 0 0 0 0 0 0 1 0 0 0 0 1 0 1 2 2 0 2 1 1 1
0 0 0 0 0

pallidicornis[7]

0 1 1 2 2 2 0 1 1 0 2 0 1 2 1 0 0 1 2 0 1 0 0 7 0 2 1 0 1 1 0 0 1 0 0 0 0 0 0 1
0 0 0 2 0 0 0 0 0 1 0 1 0 0 0 0 1 0 0 1 0 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0
8 0 0 0 1 1 0 0 0 0 1 0 1 0 2 1 2 0 0 0 0 0 0 0 1 0 0 0 0 1 0 1 2 2 0 2 1 1 1
0 0 0 0 0

pallidicornis[8]

0 1 1 2 2 2 0 1 1 0 2 0 1 2 1 0 0 1 2 0 1 0 0 7 0 2 1 0 1 1 0 0 1 0 0 0 0 0 0 1
0 0 0 2 0 0 0 0 0 1 0 1 0 0 0 0 1 0 0 1 0 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0
8 0 0 0 1 1 0 0 0 0 1 0 1 0 2 1 2 0 0 0 0 0 0 0 1 0 0 0 0 1 0 1 2 2 0 2 1 1 1
0 0 0 0 0

pallidicornis[9]

0 1 1 2 2 2 0 1 1 0 2 0 1 2 1 0 0 1 2 0 1 1 1 7 0 2 1 0 1 1 0 0 1 0 0 0 0 0 0 1
0 0 0 2 0 0 0 0 0 1 0 1 0 0 0 0 1 0 0 1 0 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0
8 0 0 0 1 1 0 0 0 0 1 0 1 0 2 1 2 0 0 0 0 0 0 0 1 0 0 0 0 1 0 1 2 2 0 2 1 1 1
0 0 0 0 0

pallidicornis[10]

0 1 1 2 2 2 0 1 1 0 2 0 1 2 1 0 0 1 2 0 1 0 0 7 0 2 1 0 1 1 0 0 1 0 0 0 0 0 0 1
0 0 0 2 0 0 0 0 0 1 0 1 0 0 0 0 1 0 0 1 0 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0
8 0 0 0 1 1 0 0 0 0 1 0 1 0 2 1 2 0 0 0 0 0 0 0 1 0 0 0 0 1 0 1 2 2 0 2 1 1 1
0 0 0 0 0

pallidior (holotype)

0 1 1 1 2 0 0 1 1 0 2 0 1 1 0 0 0 2 2 1 1 2 1 5 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 2 0 1 1 0 0 0 0 1 1 0 2 4 0 0 1 0 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 2 3 1 3 2 3 0 0 0 0 0 1 1 1 0 0 0 1 2 0 1 0 1 2 0 1 0 0 0
1 0 0 0 1

pallidior[1]

0 1 1 1 2 0 0 1 1 0 2 0 1 1 0 0 0 2 2 1 1 2 1 5 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 2 0 1 1 0 0 0 0 1 1 0 2 4 0 0 1 0 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0

8 0 0 0 0 0 0 0 0 0 0 0 2 3 1 3 2 3 0 0 0 0 0 1 1 1 0 0 0 1 2 0 1 0 1 2 0 1 0 0 0 1 0 0 0 1

pallidior[2]

0 1 1 1 2 0 0 1 1 0 2 0 1 1 0 0 0 2 2 1 1 2 1 5 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1 0 0 0 2 0 1 1 0 0 0 1 1 0 2 4 0 0 1 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 8 0 0 0 0 0 0 0 0 0 0 0 2 3 1 3 2 3 0 0 0 0 0 1 1 1 0 0 0 1 2 0 1 0 1 2 0 1 0 0 0 1 0 0 0 1

pallidior[3]

0 1 1 1 2 0 0 1 1 0 2 0 1 1 0 0 0 2 2 1 1 2 1 5 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1 0 0 0 2 0 1 1 0 0 0 1 1 0 2 4 0 0 1 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 8 0 0 0 0 0 0 0 0 0 0 0 2 3 1 3 2 3 0 0 0 0 0 1 1 1 0 0 0 1 2 0 1 0 1 2 0 1 0 0 0 1 0 0 0 1

pallidior[4]

0 1 1 1 2 0 0 1 1 0 2 0 1 1 0 0 0 2 2 1 1 2 1 5 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1 0 0 0 2 0 1 1 0 0 0 1 1 0 2 4 0 0 1 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 8 0 0 0 0 0 0 0 0 0 0 0 2 3 1 3 2 3 0 0 0 0 0 1 1 1 0 0 0 1 2 0 1 0 1 2 0 1 0 0 0 1 0 0 0 1

pallidior[5]

0 1 1 1 2 0 0 1 1 0 2 0 1 1 0 0 0 2 2 1 1 2 1 5 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1 0 0 0 2 0 1 0 0 0 0 1 1 0 2 4 0 0 1 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 8 0 0 0 0 0 0 0 0 0 0 0 2 3 1 3 2 3 0 0 0 0 0 1 1 1 0 0 0 2 2 0 1 0 1 2 0 1 0 0 0 1 0 0 0 1

pallidior[6]

0 1 1 1 2 0 0 1 1 0 2 0 1 1 0 0 0 2 2 1 1 2 1 5 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1 0 0 0 2 0 1 0 0 0 0 1 1 0 2 4 0 0 1 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 8 0 0 0 0 0 0 0 0 0 0 0 2 3 1 3 2 3 0 0 0 0 0 1 1 1 0 0 0 2 2 0 1 0 1 2 0 1 0 0 0 1 0 0 0 1

pallidior[7]

0 1 1 1 2 0 0 1 1 0 2 0 1 1 0 0 0 2 2 1 1 2 1 5 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1 0 0 0 2 0 1 1 0 0 0 1 1 0 2 4 0 0 1 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 8 0 0 0 0 0 0 0 0 0 0 0 2 3 1 3 2 3 0 0 0 0 0 1 1 1 0 0 0 1 2 0 1 0 1 2 0 1 0 0 0 1 0 0 0 1

pallidior[8]

0 1 1 1 2 0 0 1 1 0 2 0 1 1 0 0 0 2 2 1 1 2 1 5 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1

0 0 0 2 0 1 0 0 0 0 0 1 1 0 2 4 0 0 1 0 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 2 3 1 3 2 3 0 0 0 0 0 1 1 1 0 0 0 1 2 0 1 0 1 2 0 1 0 0 0
1 0 0 0 1

pallidior[9]

0 1 1 1 2 0 0 1 1 0 2 0 1 1 0 0 0 2 2 1 1 2 1 5 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 2 0 1 1 0 0 0 0 1 1 0 2 4 0 0 1 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 2 3 1 3 2 3 0 0 0 0 0 1 1 1 0 0 0 1 2 0 1 0 1 2 0 1 0 0 0
1 0 0 0 1

pallidior[10]

0 1 1 1 2 0 0 1 1 0 2 0 1 1 0 0 0 2 2 1 1 2 1 5 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 2 0 1 0 0 0 0 1 1 0 2 4 0 0 1 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 2 3 1 3 2 3 0 0 0 0 0 1 1 1 0 0 0 1 2 0 1 0 1 2 0 1 0 0 0
1 0 0 0 1

pallidior[11]

0 1 1 1 2 0 0 1 1 0 2 0 1 1 0 0 0 2 2 1 1 2 1 5 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 2 0 1 1 0 0 0 0 1 1 0 2 4 0 0 1 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 2 3 1 3 2 3 0 0 0 0 0 1 1 1 0 0 0 2 2 0 1 0 1 2 0 1 0 0 0
1 0 0 0 1

pallidior[12]

0 1 1 1 2 0 0 1 1 0 2 0 1 1 0 0 0 2 2 1 1 2 1 5 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 2 0 1 1 0 0 0 0 1 1 0 2 4 0 0 1 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 2 3 1 3 2 3 0 0 0 0 0 1 1 1 0 0 0 1 2 0 1 0 1 2 0 1 0 0 0
1 0 0 0 1

pallidior[13]

0 1 1 1 2 0 0 1 1 0 2 0 1 1 0 0 0 2 2 1 1 2 1 5 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 2 0 1 0 0 0 0 1 1 0 2 4 0 0 1 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 2 3 1 3 2 3 0 0 0 0 0 1 1 1 0 0 0 2 2 0 1 0 1 2 0 1 0 0 0
1 0 0 0 1

pallidior[14]

0 1 1 1 2 0 0 1 1 0 2 0 1 1 0 0 0 2 2 1 1 2 1 5 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 2 0 1 0 0 0 0 1 1 0 2 4 0 0 1 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 2 3 1 3 2 3 0 0 0 0 0 1 1 1 0 0 0 1 2 0 1 0 1 2 0 1 0 0 0
1 0 0 0 1

pallidior[15]

0 1 1 1 2 0 0 1 1 0 2 0 1 1 0 0 0 2 2 1 1 2 1 5 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 2 0 1 0 0 0 0 0 1 1 0 2 4 0 0 1 0 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 0 2 3 1 3 2 3 0 0 0 0 0 1 1 1 0 0 0 1 2 0 1 0 1 2 0 1 0 0 0
1 0 0 0 1

pallidior[16]

0 1 1 1 2 0 0 1 1 0 2 0 1 1 0 0 0 2 2 1 1 2 1 5 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 2 0 1 1 0 0 0 0 1 1 0 2 4 0 0 1 0 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 0 2 3 1 3 2 3 0 0 0 0 0 1 1 1 0 0 0 1 2 0 1 0 1 2 0 1 0 0 0
1 0 0 0 1

pallidior[17]

0 1 1 1 2 0 0 1 1 0 2 0 1 1 0 0 0 2 2 1 1 2 1 5 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 2 0 1 1 0 0 0 0 1 1 0 2 4 0 0 1 0 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 0 2 3 1 3 2 3 0 0 0 0 0 1 1 1 0 0 0 1 2 0 1 0 1 2 0 1 0 0 0
1 0 0 0 1

pallidior[18]

0 1 1 1 2 0 0 1 1 0 2 0 1 1 0 0 0 2 2 1 1 2 1 5 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 2 0 1 1 0 0 0 0 1 1 0 2 4 0 0 1 0 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 0 2 3 1 3 2 3 0 0 0 0 0 1 1 1 0 0 0 1 2 0 1 0 1 2 0 1 0 0 0
1 0 0 0 1

pallidus (holotype)

0 1 1 2 2 0 0 1 2 0 2 0 1 2 1 0 0 2 2 1 1 0 0 8 0 1 1 0 1 1 0 0 1 0 0 0 0 0 0 0
0 0 0 1 0 0 0 0 1 0 0 0 1 1 1 0 2 0 0 1 0 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
5 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 3 2 3 0 0 0 1 2 1 0 2 0 0 0 0 1 4 0 1 0 1 0 0 1 1 1
0 2 0 0 0

pallidus

0 1 1 2 2 0 0 1 2 0 2 0 1 2 1 0 0 2 2 1 1 1 1 8 0 1 1 0 1 1 0 0 1 0 0 0 0 0 0 0
0 0 0 1 0 0 0 0 1 0 0 0 1 1 1 0 2 0 0 1 0 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
5 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 3 2 2 0 0 0 1 2 1 0 2 0 0 0 0 1 4 0 1 0 1 0 0 1 1 1
0 2 0 0 0

parallelus (holotype)

0 1 1 2 2 0 0 1 0 0 2 0 1 2 1 0 0 2 2 0 1 2 1 9 0 2 1 0 1 1 0 0 0 0 0 0 0 0 0 1

1 0 0 1 0 0 1 1 0 0 0 1 1 1 2 4 0 0 1 0 0 1 1 1 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0

6 0 0 0 0 0 0 0 0 0 0 1 0 1 1 3 2 3 0 0 0 0 2 1 1 1 0 0 0 0 1 2 0 1 0 2 0 0 0 1 1

0 0 0 0 0

parallelus (paratype)

0 1 1 2 2 0 0 1 0 0 2 0 1 2 1 0 0 2 2 0 1 2 1 9 0 2 1 0 1 1 0 0 0 0 0 0 0 0 0 1

1 0 0 1 0 0 1 1 0 0 0 1 1 1 2 4 0 0 1 0 0 1 1 1 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0

6 0 0 0 0 0 0 0 0 0 0 1 0 1 1 3 2 3 0 0 0 0 2 1 1 1 0 0 0 0 1 2 0 1 0 2 0 0 0 1 1

0 0 0 0 0

parallelus (paratype)

0 1 1 2 2 0 0 1 0 0 2 0 1 2 1 0 0 2 2 0 1 2 1 9 0 2 1 0 1 1 0 0 0 0 0 0 0 0 0 1

1 0 0 1 0 0 1 1 0 0 0 1 1 1 2 4 0 0 1 0 0 1 1 1 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0

6 0 0 0 0 0 0 0 0 0 0 1 0 1 1 3 1 3 0 0 0 0 2 1 1 1 0 0 0 0 1 2 0 1 0 2 0 0 0 1 1

0 0 0 0 0

parallelus (paratype)

0 1 1 2 2 0 0 1 0 0 2 0 1 2 1 0 0 2 2 0 1 2 1 9 0 2 1 0 1 1 0 0 0 0 0 0 0 0 0 1

1 0 0 1 0 1 1 1 0 0 0 1 1 1 2 4 0 0 1 0 0 1 1 1 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0

6 0 0 0 0 0 0 0 0 0 0 1 0 1 1 3 2 3 0 0 0 0 2 1 1 1 0 0 0 0 1 2 0 1 0 2 0 0 0 1 1

0 0 0 0 0

paulocellatus (holotype)

0 1 0 1 0 0 0 1 0 0 2 0 1 2 2 0 0 2 2 0 0 0 4 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 0 0

1 0 0 1 0 0 1 0 0 0 0 1 1 0 1 4 0 0 1 1 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

8 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 2 2 0 0 0 0 2 1 1 1 0 0 0 0 2 2 0 0 0 1 0 0 1 1 1

1 0 0 0 1

paulocellatus (paratype)[1]

0 1 0 1 0 0 0 1 0 0 2 0 1 2 2 0 0 2 2 0 0 0 4 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 0 0

1 0 0 1 0 0 1 0 0 0 0 1 1 0 1 4 0 0 1 1 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

8 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 2 2 0 0 0 0 2 1 1 1 0 0 0 0 2 2 0 0 0 1 0 0 1 1 1

1 0 0 0 1

paulocellatus (paratype)[2]

0 1 0 1 0 0 0 1 0 0 2 0 1 2 2 0 0 2 2 0 0 1 1 4 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 0 0

1 0 0 1 0 0 1 0 0 0 0 1 1 0 1 4 0 0 1 1 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

8 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 2 2 0 0 0 0 2 1 1 1 0 0 0 0 2 2 0 0 0 1 0 0 1 1 1

1 0 0 0 1

paulocellatus (paratype)[3]

0 1 0 1 0 0 0 1 0 0 2 0 1 2 2 0 0 2 2 0 0 0 0 4 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 0
1 0 0 1 0 0 1 0 0 0 0 1 1 0 1 4 0 0 1 1 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 2 2 0 0 0 0 2 1 1 1 0 0 0 0 2 2 0 0 0 1 0 0 1 1 1
1 0 0 0 1

pedunculatoides (holotype)

0 1 1 1 2 0 0 1 0 0 2 0 1 2 1 0 0 2 2 0 1 2 1 1 0 1 2 1 0 1 0 0 0 0 0 0 0 0 0 1
1 0 0 1 0 0 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 1 0 0 3 2 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0
4 0 1 0 0 0 0 0 0 0 0 1 0 1 1 0 1 2 0 0 0 0 2 1 0 1 0 0 0 0 2 2 0 1 0 2 0 0 0 1 1
0 0 0 0 0

pedunculatoides (paratype)[1]

0 1 1 1 2 0 0 1 0 0 2 0 1 2 1 0 0 2 2 0 1 2 1 1 0 1 2 1 0 1 0 0 0 0 0 0 0 0 0 1
1 0 0 1 0 0 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 1 0 0 3 2 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0
4 0 1 0 0 0 0 0 0 0 0 1 0 1 1 0 1 2 0 0 0 0 2 1 0 1 0 0 0 0 2 2 0 1 0 2 0 0 0 1 1
0 0 0 0 0

pedunculatoides (paratype)[2]

0 1 1 1 2 0 0 1 0 0 2 0 1 2 1 0 0 2 2 0 1 2 1 1 0 1 2 1 0 1 0 0 0 0 0 0 0 0 0 1
1 0 0 1 0 0 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 1 0 0 3 2 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0
4 0 1 0 0 0 0 0 0 0 0 1 0 1 1 0 1 2 0 0 0 0 2 1 0 1 0 0 0 0 2 2 0 1 0 2 0 0 0 1 1
0 0 0 0 0

pedunculatoides (paratype)[3]

0 1 1 1 2 0 0 1 0 0 2 0 1 2 1 0 0 2 2 0 1 2 1 1 0 1 2 1 0 1 0 0 0 0 0 0 0 0 0 1
1 0 0 1 0 0 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 1 0 0 3 2 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0
4 0 1 0 0 0 0 0 0 0 0 1 0 1 1 0 1 2 0 0 0 0 2 1 0 1 0 0 0 0 2 2 0 1 0 2 0 0 0 1 1
0 0 0 0 0

pedunculatoides (paratype)[4]

0 1 1 1 2 0 0 1 0 0 2 0 1 2 1 0 0 2 2 0 1 2 1 1 0 1 2 1 0 1 0 0 0 0 0 0 0 0 0 1
I 0 0 1 0 0 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 1 0 0 3 2 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0
4 0 1 0 0 0 0 0 0 0 0 1 0 1 1 0 1 2 0 0 0 0 2 1 0 1 0 0 0 0 2 2 0 1 0 2 0 0 0 1 1
0 0 0 0 0

pedunculatoides (paratype)[5]

0 1 1 1 2 0 0 1 0 0 2 0 1 2 1 0 0 2 2 0 1 2 1 1 0 1 2 1 0 1 0 0 0 0 0 0 0 0 0 1
1 0 0 1 0 0 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 1 0 0 3 2 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0

4 0 1 0 0 0 0 0 0 0 1 0 1 1 0 1 2 0 0 0 0 2 1 0 1 0 0 0 0 2 2 0 1 0 2 0 0 0 1 1 0 0 0 0 0

pedunculatoides[1]

0 1 1 1 2 0 0 1 0 0 2 0 1 2 1 0 0 2 2 0 1 2 1 1 0 1 2 1 0 1 0 0 0 0 0 0 0 0 0 1 1 0 0 1 0 0 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 0 3 2 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 4 0 1 0 0 0 0 0 0 0 1 0 1 1 1 0 2 0 0 0 0 2 1 0 1 0 0 0 0 2 2 0 1 0 2 0 0 0 1 1 0 0 0 0 0

pedunculatoides[2]

0 1 1 1 2 0 0 1 0 0 2 0 1 2 1 0 0 2 2 0 1 2 1 1 0 1 2 1 0 1 0 0 0 0 0 0 0 0 0 1 1 0 0 1 0 0 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 0 3 2 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 4 0 1 0 0 0 0 0 0 0 1 0 1 1 1 0 2 0 0 0 0 2 1 0 1 0 0 0 0 2 2 0 1 0 2 0 0 0 1 1 0 0 0 0 0

pedunculatoides[3]

0 1 1 1 2 0 0 1 0 0 2 0 1 2 1 0 0 2 2 0 1 2 1 1 0 1 2 1 0 1 0 0 0 0 0 0 0 0 0 1 1 0 0 1 0 0 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 0 3 2 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 4 0 1 0 0 0 0 0 0 0 1 0 1 1 0 0 2 0 0 0 0 2 1 0 1 0 0 0 0 2 2 0 1 0 2 0 0 0 1 1 0 0 0 0 0

pedunculatoides[4]

0 1 1 1 2 0 0 1 0 0 2 0 1 2 1 0 0 2 2 0 1 2 1 1 0 1 2 1 0 1 0 0 0 0 0 0 0 0 0 1 1 0 0 1 0 0 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 0 3 2 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 4 0 1 0 0 0 0 0 0 0 1 0 1 1 1 0 2 0 0 0 0 2 1 0 1 0 0 0 0 2 2 0 1 0 2 0 0 0 1 1 0 0 0 0 0

pedunculatoides[5]

0 1 1 1 2 0 0 1 0 0 2 0 1 2 1 0 0 2 2 0 1 2 1 1 0 1 2 1 0 1 0 0 0 0 0 0 0 0 0 1 I 0 0 1 0 0 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 0 3 2 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 4 0 1 0 0 0 0 0 0 0 1 0 1 1 1 1 2 0 0 0 0 2 1 0 1 0 0 0 0 2 2 0 1 0 2 0 0 0 1 1 0 0 0 0 0

pedunculatoides[6]

0 1 1 1 2 0 0 1 0 0 2 0 1 2 1 0 0 2 2 0 1 2 1 1 0 1 2 1 0 1 0 0 0 0 0 0 0 0 0 1 1 0 0 1 0 0 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 0 3 2 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 4 0 1 0 0 0 0 0 0 0 1 0 1 1 1 1 0 2 0 0 0 0 2 1 0 1 0 0 0 0 2 2 0 1 0 2 0 0 0 1 1 0 0 0 0 0

pedunculatoides[7]

0 1 1 1 2 0 0 1 0 0 2 0 1 2 1 0 0 2 2 0 1 2 1 1 0 1 2 1 0 1 0 0 0 0 0 0 0 0 0 1

1 0 0 1 0 0 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 1 0 0 3 2 0 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0
4 0 1 0 0 0 0 0 0 0 0 1 0 1 1 0 1 2 0 0 0 0 2 1 0 1 0 0 0 0 0 2 2 0 1 0 2 0 0 0 1 1 0 0 0 0 0

pedunculatoides[8]

0 1 1 1 2 0 0 1 0 0 2 0 1 2 1 0 0 2 2 0 1 2 1 1 0 1 2 1 0 1 2 1 0 0 0 0 0 0 0 0 0 1
1 0 0 1 0 0 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 1 0 0 3 2 0 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0
4 0 1 0 0 0 0 0 0 0 0 1 0 1 1 0 1 2 0 0 0 0 2 1 0 1 0 0 0 0 0 2 2 0 1 0 2 0 0 0 1 1 0 0 0 0 0

pedunculatoides[9]

0 1 1 1 2 0 0 1 0 0 2 0 1 2 1 0 0 2 2 0 1 2 1 1 0 1 2 1 0 1 2 1 0 0 0 0 0 0 0 0 0 1
1 0 0 1 0 0 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 1 0 0 3 2 0 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0
4 0 1 0 0 0 0 0 0 0 0 1 0 1 1 0 0 0 2 0 0 0 0 2 1 0 1 0 0 0 0 2 2 0 1 0 2 0 0 0 1 1 0 0 0 0 0

pedunculatus (paralectotype)[1]

0 1 1 2 2 0 0 1 1 0 2 0 1 2 1 0 0 2 1 0 1 2 1 9 0 2 1 0 1 1 0 0 0 0 0 0 0 0 0 1
1 0 0 1 0 0 0 0 0 0 0 1 1 0 1 3 1 0 1 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
5 0 1 0 0 0 0 0 0 0 0 0 0 1 0 1 2 3 0 0 0 0 0 0 2 0 0 0 0 2 3 3 1 0 2 0 0 0 1 1 0 0 0 0 0

pedunculatus (paralectotype)[2]

0 1 1 2 2 0 0 1 1 0 2 0 1 2 1 0 0 2 2 0 1 2 1 9 0 2 1 0 1 1 0 0 0 0 0 0 0 0 0 1
1 0 0 2 0 1 0 1 0 0 0 1 1 0 1 3 1 0 1 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
5 0 1 0 0 0 0 0 0 0 0 0 0 1 0 1 2 2 0 0 0 0 0 2 1 0 0 0 2 3 3 1 0 2 0 0 0 1 1 0 0 0 0 0

pedunculatus

0 1 1 2 2 0 0 1 1 0 2 0 1 2 1 0 0 2 1 0 1 2 1 9 0 2 1 0 1 1 0 0 0 0 0 0 0 0 0 1
1 0 0 2 0 1 0 1 0 0 0 1 1 0 1 3 1 0 1 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
5 0 1 0 0 0 0 0 0 0 0 0 0 1 0 1 2 3 0 0 0 0 0 0 2 1 0 0 0 2 3 3 1 0 2 0 0 0 1 1 0 0 0 0 0

petiolatus (holotype)

0 1 1 0 2 2 0 1 1 0 2 0 1 0 1 1 1 0 0 2 2 0 1 0 0 2 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 2 0 1 0 0 0 0 0 1 0 0 0 0 1 0 0 0 0 0 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 1 2 2 2 4 2 3 0 0 0 0 0 0 2 2 2 1 0 0 1 1 0 1 2 0 1 0 0 0

1 0 0 0 1

petiolatus (paratype)[1]

0 1 1 0 2 2 0 1 1 0 2 0 1 1 1 0 0 2 2 0 1 0 0 2 0 2 1 0 1 1 0 1 1 0 0 0 0 0 1

0 0 0 2 0 1 0 0 0 0 0 1 0 0 0 0 1 0 0 0 0 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0

8 0 0 0 0 0 0 0 0 0 0 1 2 2 2 4 2 3 0 0 0 0 0 2 2 2 1 0 0 1 1 0 1 0 1 2 0 1 0 0 0

1 0 0 0 1

petiolatus (paratype)[2]

0 1 1 0 2 2 0 1 1 0 2 0 1 1 1 0 0 2 2 0 1 0 0 2 0 2 1 0 1 1 0 1 1 0 0 0 0 0 1

0 0 0 2 0 1 0 0 0 0 0 1 0 0 0 0 1 0 0 0 0 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0

8 0 0 0 0 0 0 0 0 0 0 1 2 2 2 4 2 3 0 0 0 0 0 2 2 2 1 0 0 1 1 0 1 0 1 2 0 1 0 0 0

1 0 0 0 1

petiolatus (paratype)[3]

0 1 1 0 2 2 0 1 1 0 2 0 1 1 1 0 0 2 2 0 1 0 0 2 0 2 1 0 1 1 0 1 1 0 0 0 0 0 1

0 0 0 1 0 1 0 0 0 0 0 1 0 0 0 0 1 0 0 0 0 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0

8 0 0 0 0 0 0 0 0 0 0 1 2 2 2 4 2 3 0 0 0 0 0 2 2 2 1 0 0 1 1 0 1 0 1 2 0 1 0 0 0

1 0 0 0 1

petiolatus (paratype)[4]

0 1 1 0 2 2 0 1 1 0 2 0 1 1 1 0 0 2 2 0 1 0 0 2 0 2 1 0 1 1 0 1 1 0 0 0 0 0 1

0 0 0 2 0 1 0 0 0 0 0 1 0 0 0 0 1 0 0 0 0 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0

8 0 0 0 0 0 0 0 0 0 0 1 2 2 2 4 2 3 0 0 0 0 0 2 2 2 1 0 0 1 1 0 1 0 1 2 0 1 0 0 0

1 0 0 0 1

petiolatus (paratype)[5]

0 1 1 0 2 2 0 1 1 0 2 0 1 1 1 0 0 2 2 0 1 0 0 2 0 2 1 0 1 1 0 1 1 0 0 0 0 0 1

0 0 0 1 0 1 0 0 0 0 0 1 0 0 0 0 1 0 0 0 0 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0

8 0 0 0 0 0 0 0 0 0 0 1 2 2 2 4 2 3 0 0 0 0 0 2 2 2 1 0 0 1 1 0 1 0 1 2 0 1 0 0 0

1 0 0 0 1

petiolatus (paratype)[6]

0 1 1 0 2 2 0 1 1 0 2 0 1 1 1 0 0 2 2 0 1 0 0 2 0 2 1 0 1 1 0 1 1 0 0 0 0 0 1

0 0 0 2 0 1 0 0 0 0 0 1 0 0 0 0 1 0 0 0 0 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0

8 0 0 0 0 0 0 0 0 0 0 1 2 2 2 4 2 3 0 0 0 0 0 2 2 2 1 0 0 1 1 0 1 0 1 2 0 1 0 0 0

1 0 0 0 1

petiolatus (paratype)[7]

0 1 1 0 2 2 0 1 1 0 2 0 1 1 1 0 0 2 2 0 1 0 0 2 0 2 1 0 1 1 0 1 1 0 0 0 0 0 1

0 0 0 2 0 1 0 0 0 0 0 1 0 0 0 0 1 0 0 0 0 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0

8 0 0 0 0 0 0 0 0 0 0 1 2 2 2 4 2 3 0 0 0 0 0 2 2 2 1 0 0 1 1 0 1 0 1 2 0 1 0 0 0
1 0 0 0 1

protuberans (holotype)

0 1 1 2 2 0 0 1 0 0 2 0 1 2 2 2 0 0 2 2 0 1 0 0 9 3 0 0 0 1 1 0 0 0 0 0 0 0 0 0
0 0 1 1 0 0 0 0 0 0 0 1 1 0 0 1 0 0 1 1 0 2 2 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0
3 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 2 0 0 1 0 2 0 0 0 0 0 0 0 2 3 1 1 0 2 0 0 0 1 1
0 0 0 0 0

protuberans (paratype)[1]

0 1 1 2 2 0 0 1 0 0 2 0 1 2 2 0 0 2 2 0 1 0 0 9 3 0 0 0 1 1 0 0 0 0 0 0 0 0 0
0 0 1 1 0 0 0 0 0 0 0 1 1 0 0 1 0 0 1 1 0 2 2 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0
3 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 2 0 0 1 0 2 0 0 0 0 0 0 0 2 3 1 1 0 2 0 0 0 1 1
0 0 0 0 0

protuberans (paratype)[2]

0 1 1 2 2 0 0 1 0 0 2 0 1 2 2 0 0 2 2 0 1 0 0 9 3 0 0 0 1 1 0 0 0 0 0 0 0 0 0
0 0 1 1 0 0 0 0 0 0 0 1 1 0 0 1 0 0 1 1 0 2 2 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0
3 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 2 0 0 1 0 2 0 0 0 0 0 0 0 2 3 1 1 0 2 0 0 0 1 1
0 0 0 0 0

protuberans (paratype)[3]

0 1 1 2 2 0 0 1 0 0 2 0 1 2 2 0 0 2 2 0 1 0 0 9 3 0 0 0 1 1 0 0 0 0 0 0 0 0 0
0 0 1 1 0 0 0 0 0 0 0 1 1 0 0 1 0 0 1 1 0 2 2 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0
3 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 2 0 0 1 0 2 0 0 0 0 0 0 0 2 3 1 1 0 2 0 0 0 1 1
0 0 0 0 0

protuberans (paratype)[4]

0 1 1 2 2 0 0 1 0 0 2 0 1 2 2 0 0 2 2 0 1 2 1 9 3 0 0 0 1 1 0 0 0 0 0 0 0 0 0
0 0 1 1 0 0 0 0 0 0 0 1 1 0 0 1 0 0 1 1 0 2 2 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0
3 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 2 0 0 1 0 2 0 0 0 0 0 0 0 2 3 1 1 0 2 0 0 0 1 1
0 0 0 0 0

recurvatus (holotype)

0 1 1 2 2 2 2 2 1 0 2 0 1 2 1 0 0 2 2 0 1 2 1 6 0 2 1 0 1 1 0 0 0 0 0 0 0 0 0
0 0 0 1 0 0 0 0 0 0 0 1 0 0 2 4 0 0 1 0 1 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0
9 0 0 0 0 0 0 2 0 0 1 0 1 0 2 1 2 0 0 0 0 0 0 1 1 0 0 0 2 3 0 0 0 2 0 0 1 1 1
0 0 1 0 0

saharicus (holotype)

0 1 1 1 1 0 0 1 1 0 2 0 1 2 1 0 0 2 2 0 1 1 1 1 0 2 0 0 1 1 0 0 2 0 0 0 0 0 0 1
0 0 0 2 0 1 0 0 0 1 1 1 1 0 0 1 0 0 1 0 1 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 0 0 0 0 0 0 0 0 0 0 0 1 1 2 1 3 1 2 0 0 0 0 0 1 1 2 1 0 0 0 2 3 0 1 0 2 1 2 1 1 1
0 0 1 0 0

saharicus (paratype)[1]

0 1 1 1 1 0 0 1 1 0 2 0 1 2 1 0 0 2 2 0 1 1 1 1 0 2 0 0 1 1 0 0 2 0 0 0 0 0 0 1
0 0 0 2 0 1 0 0 0 1 1 1 1 0 0 1 0 0 1 0 1 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 0 0 0 0 0 0 0 0 0 0 0 1 1 2 1 3 1 2 0 0 0 0 0 1 1 2 1 0 0 0 2 3 0 1 0 2 1 2 1 1 1
0 0 1 0 0

saharicus (paratype)[2]

0 1 1 1 1 0 0 1 1 0 2 0 1 2 1 0 0 2 2 0 1 1 1 1 0 2 0 0 1 1 0 0 2 0 0 0 0 0 0 1
0 0 0 2 0 1 0 0 0 1 1 1 1 0 0 1 0 0 1 0 1 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 0 0 0 0 0 0 0 0 0 0 0 1 1 2 1 3 1 2 0 0 0 0 0 1 1 2 1 0 0 0 2 3 0 1 0 2 1 2 1 1 1
0 0 1 0 0

saharicus (paratype)[3]

0 1 1 1 1 0 0 1 1 0 2 0 1 2 1 0 0 2 2 0 1 1 1 1 0 2 0 0 1 1 0 0 2 0 0 0 0 0 0 1
0 0 0 2 0 1 0 0 0 1 1 1 1 0 0 1 0 0 1 0 1 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 0 0 0 0 0 0 0 0 0 0 0 1 1 2 1 3 1 2 0 0 0 0 0 1 1 2 1 0 0 0 2 3 0 1 0 2 1 2 1 1 1
0 0 1 0 0

saharicus (paratype)[4]

0 1 1 1 1 0 0 1 1 0 2 0 1 2 1 0 0 2 2 0 1 1 1 1 0 2 0 0 1 1 0 0 2 0 0 0 0 0 0 1
0 0 0 2 0 1 0 0 0 1 1 1 1 0 0 1 0 0 1 0 1 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 0 0 0 0 0 0 0 0 0 0 0 1 1 2 1 3 1 2 0 0 0 0 0 1 1 2 1 0 0 0 2 3 0 1 0 2 1 2 1 1 1
0 0 1 0 0

saharicus (paratype)[5]

0 1 1 1 1 0 0 1 1 0 2 0 1 2 1 0 0 2 2 0 1 1 1 1 0 2 0 0 1 1 0 0 2 0 0 0 0 0 0 1
0 0 0 2 0 1 0 0 0 1 1 1 1 0 0 1 0 0 1 0 1 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 0 0 0 0 0 0 0 0 0 0 0 1 1 2 1 3 1 2 0 0 0 0 0 1 1 2 1 0 0 0 2 3 0 1 0 2 1 2 1 1 1
0 0 1 0 0

saharicus (paratype)[6]

0 1 1 1 1 0 0 1 1 0 2 0 1 2 1 0 0 2 2 0 1 1 1 1 0 2 0 0 1 1 0 0 2 0 0 0 0 0 0 1
0 0 0 2 0 1 0 0 0 1 1 1 1 0 0 1 0 0 1 0 1 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 0 0 0 0 0 0 0 0 0 0 0 1 1 2 1 3 1 2 0 0 0 0 0 1 1 2 1 0 0 0 2 3 0 1 0 2 1 2 1 1 1

0 0 1 0 0

saharicus (paratype)[7]

0 1 1 1 1 0 0 1 1 0 2 0 1 2 1 0 0 2 2 0 1 1 1 1 0 2 0 0 1 1 0 0 2 0 0 0 0 0 0 1

0 0 0 2 0 1 0 0 0 1 1 1 1 0 0 1 0 0 1 0 1 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1 0 0 0 0 0 0 0 0 0 0 0 1 1 2 1 3 1 2 0 0 0 0 0 1 1 2 1 0 0 0 2 3 0 1 0 2 1 2 1 1 1

0 0 1 0 0

saharicus (paratype)[8]

0 1 1 1 1 0 0 1 1 0 2 0 1 2 1 0 0 2 2 0 1 1 1 1 0 2 0 0 1 1 0 0 2 0 0 0 0 0 0 1

0 0 0 2 0 1 0 0 0 1 1 1 1 0 0 1 0 0 1 0 1 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1 0 0 0 0 0 0 0 0 0 0 0 1 1 2 1 3 1 2 0 0 0 0 0 1 1 2 1 0 0 0 2 3 0 1 0 2 1 2 1 1 1

0 0 1 0 0

saharicus (paratype)[9]

0 1 1 1 1 0 0 1 1 0 2 0 1 2 1 0 0 2 2 0 1 1 1 1 0 2 0 0 1 1 0 0 2 0 0 0 0 0 0 1

0 0 0 2 0 1 0 0 0 1 1 1 1 0 0 1 0 0 1 0 1 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1 0 0 0 0 0 0 0 0 0 0 0 1 1 2 1 3 1 2 0 0 0 0 0 1 1 2 1 0 0 0 2 3 0 1 0 2 1 2 1 1 1

0 0 1 0 0

saharicus (paratype)[10]

0 1 1 1 1 0 0 1 1 0 2 0 1 2 1 0 0 2 2 0 1 1 1 1 0 2 0 0 1 1 0 0 2 0 0 0 0 0 0 1

0 0 0 2 0 1 0 0 0 1 1 1 1 0 0 1 0 0 1 0 1 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1 0 0 0 0 0 0 0 0 0 0 0 1 1 2 1 3 1 2 0 0 0 0 0 1 1 2 1 0 0 0 2 3 0 1 0 2 1 2 1 1 1

0 0 1 0 0

saharicus (paratype)[11]

0 1 1 1 1 0 0 1 1 0 2 0 1 2 1 0 0 2 2 0 1 1 1 1 0 2 0 0 1 1 0 0 2 0 0 0 0 0 0 1

0 0 0 2 0 1 0 0 0 1 1 1 1 0 0 1 0 0 1 0 1 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1 0 0 0 0 0 0 0 0 0 0 0 1 1 2 1 3 1 2 0 0 0 0 0 1 1 2 1 0 0 0 2 3 0 1 0 2 1 2 1 1 1

0 0 1 0 0

saharicus[1]

0 1 1 1 1 0 0 1 1 0 2 0 1 2 1 0 0 2 2 0 1 1 1 1 0 2 0 0 1 1 0 0 2 0 0 0 0 0 0 1

0 0 0 2 0 1 0 0 0 1 1 1 1 0 0 1 0 0 1 0 1 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1 0 0 0 0 0 0 0 0 0 0 0 1 1 2 1 3 1 2 0 0 0 0 0 1 1 2 1 0 0 0 2 3 0 1 0 2 1 2 1 1 1

0 0 1 0 0

saharicus[2]

0 1 1 1 1 0 0 1 1 0 2 0 1 2 1 0 0 2 2 0 1 1 1 1 0 2 0 0 1 1 0 0 2 0 0 0 0 0 0 1

0 0 0 2 0 1 0 0 0 1 1 1 1 0 0 1 0 0 1 0 1 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

10000000000 1121312000 0011210002 3010212111
00100

saharicus[3]

0111100110 2012100220 1111020011 0020000001
0002010001 1110010010 1220000000 0000000000
10000000000 1121312000 0011210002 3010212111
00100

saharicus[4]

0111100110 2012100220 1111020011 0020000001
0002010001 1110010010 1220000000 0000000000
10000000000 1121312000 0011210002 3010212111
00100

scorteccii (holotype)

0112220110 2012100220 1217021110 0020000001
1001001000 0111010010 0220000000 0000000000
8000000000 0004410000 0200210001 0012202111
00000

scorteccii (paratype)[1]

0112220110 2012100220 1217021110 0020000001
1001011000 0111010010 0220000000 0000000000
8000000000 0001410000 0200210001 0012202111
00000

signatipennis (holotype)

1002100100 2012200120 1214121011 0110000001
0001000000 0110010011 0220000000 0000000000
11000000000 0010103000 1211100001 2000100011
00000

signatipennis[1]

1002100100 2012200120 1214121011 0110000001
0001000000 0110010011 0220000000 0000000000
11000000000 0010103000 1211100001 2000100011
00000

signatipennis[2]

1 0 0 2 1 0 0 1 0 0 2 0 1 2 2 0 0 1 2 0 1 2 1 4 1 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 0 0 0 0 0 0 1 1 0 0 1 0 0 1 1 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 3 0 0 0 1 2 1 1 1 0 0 0 0 1 2 0 0 0 1 0 0 0 1 1
0 0 0 0 0

signatipennis[3]

1 0 0 2 1 0 0 1 0 0 2 0 1 2 2 0 0 1 2 0 1 2 1 4 1 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 0 0 0 0 0 0 1 1 0 0 1 0 0 1 1 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 3 0 0 0 1 2 1 1 1 0 0 0 0 1 2 0 0 0 1 0 0 0 1 1
0 0 0 0 0

signatipennis[4]

1 0 0 2 1 0 0 1 0 0 2 0 1 2 2 0 0 1 2 0 1 2 1 4 1 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 0 0 0 0 0 0 1 1 0 0 1 0 0 1 1 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 3 0 0 0 1 2 1 1 1 0 0 0 0 1 2 0 0 0 1 0 0 0 1 1
0 0 0 0 0

signatipennis[5]

1 0 0 2 1 0 0 1 0 0 2 0 1 2 2 0 0 1 2 0 1 2 1 4 1 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 0 0 0 0 0 0 1 1 0 0 1 0 0 1 1 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 3 0 0 0 1 2 1 1 1 0 0 0 0 1 2 0 0 0 1 0 0 0 1 1
0 0 0 0 0

signatipennis[6]

1 0 0 2 1 0 0 1 0 0 2 0 1 2 2 0 0 1 2 0 1 2 1 4 1 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 0 0 0 0 0 0 1 1 0 0 1 0 0 1 1 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 3 0 0 0 1 2 1 1 1 0 0 0 0 1 2 0 0 0 1 0 0 0 1 1
0 0 0 0 0

signatipennis[7]

1 0 0 2 1 0 0 1 0 0 2 0 1 2 2 0 0 1 2 0 1 2 1 4 1 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 0 0 0 0 0 0 1 1 0 0 1 0 0 1 1 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 3 0 0 0 1 2 1 1 1 0 0 0 0 1 2 0 0 0 1 0 0 0 1 1
0 0 0 0 0

signatipennis[8]

1 0 0 2 1 0 0 1 0 0 2 0 1 2 2 0 0 1 2 0 1 2 1 4 1 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 0 0 0 0 0 0 1 1 0 0 1 0 0 1 1 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 3 0 0 0 1 2 1 1 1 0 0 0 0 1 2 0 0 0 1 0 0 0 1 1

00000

signatipennis[9]

1002100100 2012200120 1214121011 0110000001
0001000000 0110010011 0220000000 0000000000
1100000000000 0010103000 1211100001 2000100011
00000

signatipennis[10]

1002100100 2012200120 1214121011 0110000001
0001000000 0110010011 0220000000 0000000000
1100000000000 0010103000 1211100001 2000100011
00000

signatipennis[11]

1002100100 2012200120 1214121011 0110000001
0001000000 0110010011 0220000000 0000000000
1100000000000 0010103000 1211100001 2000100011
00000

signatipennis[12]

1002100100 2012200120 1214121011 0110000001
0001000000 0110010011 0220000000 0000000000
1100000000000 0010103000 1211100001 2000100011
00000

signatipennis[13]

1002100100 2012200120 1214121011 0110000001
0001000000 0110010011 0220000000 0000000000
1100000000000 0010103000 1211100001 2000100011
00000

signatipennis[14]

1002100100 2012200120 1214121011 0110000001
0001000000 0110010011 0220000000 0000000000
1100000000000 0010103000 1211100001 2000100011
00000

signatipennis[15]

1002100100 2012200120 1214121011 0110000001
0001000000 0110010011 0220000000 0000000000

11 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 3 0 0 0 1 2 1 1 1 0 0 0 0 1 2 0 0 0 1 0 0 0 1 1 0 0 0 0 0

signatipennis[16]

1 0 0 2 1 0 0 1 0 0 2 0 1 2 2 0 0 1 2 0 1 2 1 4 1 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1 0 0 0 1 0 0 0 0 0 0 0 1 1 0 0 1 0 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 11 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 3 0 0 0 1 2 1 1 1 0 0 0 0 1 2 0 0 0 1 0 0 0 1 1 0 0 0 0 0

signatipennis[17]

1 0 0 2 1 0 0 1 0 0 2 0 1 2 2 0 0 1 2 0 1 2 1 4 1 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1 0 0 0 1 0 0 0 0 0 0 1 1 0 0 1 0 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 11 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 3 0 0 0 1 2 1 1 1 0 0 0 0 1 2 0 0 0 1 0 0 0 1 1 0 0 0 0 0

signatipennis[18]

1 0 0 2 1 0 0 1 0 0 2 0 1 2 2 0 0 1 2 0 1 2 1 4 1 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1 0 0 0 1 0 0 0 0 0 0 1 1 0 0 1 0 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 11 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 3 0 0 0 1 2 1 1 1 0 0 0 0 1 2 0 0 0 1 0 0 0 1 1 0 0 0 0 0

sinuatus (holotype)

0 1 1 1 2 0 0 1 0 0 2 0 1 2 2 0 0 1 2 0 1 2 1 1 0 0 2 1 0 1 1 0 0 0 0 0 0 0 0 1 0 0 1 1 0 0 0 0 0 0 0 0 1 1 0 1 0 0 1 0 0 3 2 0 0 0 0 0 0 0 0 1 0 0 0 0 0 1 0 0 4 0 1 0 0 0 0 0 1 1 1 0 1 0 1 1 3 0 0 1 0 2 1 1 2 0 0 0 0 1 3 2 1 0 2 0 0 0 1 1 0 0 0 0 0

sinuatus (paratype)

0 1 1 1 2 0 0 1 0 0 2 0 1 2 2 0 0 1 2 0 1 2 1 1 0 0 2 1 0 1 1 0 0 0 0 0 0 0 0 1 0 0 1 1 0 0 0 0 0 0 0 0 1 1 0 1 0 0 1 0 0 3 2 0 0 0 0 0 0 0 0 1 0 0 0 0 0 1 0 0 4 0 1 0 0 0 0 0 1 1 1 0 1 0 1 1 3 0 0 1 0 2 1 1 2 0 0 0 0 1 3 2 1 0 2 0 0 0 1 1 0 0 0 0 0

sinuatus (paratype)

0 1 1 1 2 0 0 1 0 0 2 0 1 2 2 0 0 1 2 0 1 2 1 1 0 0 2 1 0 1 1 0 0 0 0 0 0 0 0 1 0 0 1 1 0 0 0 0 0 0 0 0 1 1 0 1 0 0 1 0 0 3 2 0 0 0 0 0 0 0 0 1 0 0 0 0 0 1 0 0 4 0 1 0 0 0 0 0 1 1 1 0 1 0 1 1 3 0 0 1 0 2 1 1 2 0 0 0 0 1 3 2 1 0 2 0 0 0 1 1 0 0 0 0 0

stigmaticus (holotype)

1 1 1 2 0 0 0 1 1 0 2 0 1 2 2 0 0 2 2 0 1 2 1 4 1 1 0 0 1 1 0 1 1 0 0 0 0 0 1
0 0 0 1 0 1 0 0 0 0 0 0 1 1 1 3 1 0 1 1 1 1 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 1 3 0 0 0 1 2 1 1 1 0 0 0 0 1 2 0 0 0 1 0 0 0 1 1
0 0 0 0 1

semistriataeformis (holotype)

1 1 1 2 0 0 0 1 1 0 2 0 1 2 2 0 0 2 2 0 1 2 1 4 1 1 0 0 1 1 0 1 1 0 0 0 0 0 1
0 0 0 1 0 1 0 0 0 0 0 0 1 1 1 3 1 0 1 1 1 1 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 1 3 0 0 0 1 2 1 1 1 0 0 0 0 1 2 0 0 0 1 0 0 0 1 1
0 0 0 0 1

stigmaticus[1]

1 1 1 2 0 0 0 1 1 0 2 0 1 2 2 0 0 2 2 0 1 2 1 4 1 1 0 0 1 1 0 1 1 0 0 0 0 0 1
0 0 0 1 0 1 0 0 0 0 0 0 1 1 1 3 1 0 1 1 1 1 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 1 3 0 0 0 1 2 1 1 1 0 0 0 0 1 2 0 0 0 1 0 0 0 1 1
0 0 0 0 1

stigmaticus[2]

1 1 1 2 0 0 0 1 1 0 2 0 1 2 2 0 0 2 2 0 1 2 1 4 1 1 0 0 1 1 0 1 1 0 0 0 0 0 1
0 0 0 1 0 1 0 0 0 0 0 0 1 1 1 3 1 0 1 1 1 1 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 1 3 0 0 0 1 2 1 1 1 0 0 0 0 1 2 0 0 0 1 0 0 0 1 1
0 0 0 0 1

stigmaticus[3]

1 1 1 2 0 0 0 1 1 0 2 0 1 2 2 0 0 2 2 0 1 2 1 4 1 1 0 0 1 1 0 1 1 0 0 0 0 0 1
0 0 0 1 0 1 0 0 0 0 0 0 1 1 1 3 1 0 1 1 1 1 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 1 3 0 0 0 1 2 1 1 1 0 0 0 0 1 2 0 0 0 1 0 0 0 1 1
0 0 0 0 1

stigmaticus[4]

1 1 1 2 0 0 0 1 1 0 2 0 1 2 2 0 0 2 2 0 1 2 1 4 1 1 0 0 1 1 0 1 1 0 0 0 0 0 1
0 0 0 1 0 1 0 0 0 0 0 0 1 1 1 3 1 0 1 1 1 1 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 3 0 0 0 1 2 1 1 1 0 0 0 0 1 2 0 0 0 1 0 0 0 1 1
0 0 0 0 1

stigmaticus[5]

1 1 1 2 0 0 0 1 1 0 2 0 1 2 2 0 0 2 2 0 1 2 1 4 1 1 0 0 1 1 0 1 1 0 0 0 0 0 1
0 0 0 1 0 1 0 0 0 0 0 0 1 1 1 3 1 0 1 1 1 1 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 3 0 0 0 1 2 1 1 1 0 0 0 0 1 2 0 0 0 1 0 0 0 1 1

00001

stigmaticus[6]

1112000110 2012200220 1214110011 0110000001
0001010000 0011131011 1120000000 0000000000
1100000000 0011013000 1211100001 2000100011
00001

stigmaticus[7]

1112000110 2012200220 1214110011 0110000001
0001010000 0011131011 1120000000 0000000000
1100000000 0011013000 1211100001 2000100011
00001

stigmaticus[8]

1112000110 2012200220 1214110011 0110000001
0001010000 0011131011 1120000000 0000000000
1100000000 0011113000 1211100001 2000100011
00001

sudanensis (paratype)[1]

0111200100 2012200120 1219121011 0000000001
0002010000 0010010010 0320000002 0120000000
5010000000 0010112001 0200100112 3310000011
00000

sudanensis (paratype)[2]

0111200100 2012200120 1219121011 0000000001
0002010000 0010010010 0320000002 0120000000
5010000000 0010112001 0200100112 3310000011
00000

sudanensis (paratype)[3]

0111200100 2012200120 1219121011 0000000001
0002010000 0010010010 0320000002 0120000000
5010000000 0010112001 0200100112 3310000011
00000

sudanensis (paratype)[4]

0111200100 2012200120 1219121011 0000000001

0 0 0 1 0 0 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 0 1 0 0 2 2 0 0 0 0 0 0 0 2 0 1 2 0 0 0 0 0 0 0
5 0 1 0 0 0 0 0 0 0 0 0 0 1 0 1 1 2 0 0 1 0 2 0 0 1 0 0 1 1 2 3 3 1 0 0 0 0 0 1 1
0 0 0 0 0

sudanensis (paratype)[5]

0 1 1 1 2 0 0 1 0 0 2 0 1 2 2 0 0 1 2 0 1 1 1 9 1 2 1 0 1 1 0 0 0 0 0 0 0 0 0 1
0 0 0 2 0 1 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 3 2 0 0 0 0 0 0 2 0 1 2 0 0 0 0 0 0 0
5 0 1 0 0 0 0 0 0 0 0 0 0 1 0 1 1 2 0 0 1 0 2 0 0 1 0 0 1 1 2 3 3 1 0 0 0 0 0 1 1
0 0 0 0 0

sudanensis[1]

0 1 1 1 2 0 0 1 0 0 2 0 1 2 2 0 0 1 2 0 1 2 1 9 1 2 1 0 1 1 0 0 0 0 0 0 0 0 0 1
0 0 0 1 0 0 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 3 2 0 0 0 0 0 0 2 0 1 2 0 0 0 0 0 0 0
5 0 1 0 0 0 0 0 0 0 0 0 0 1 0 1 1 2 0 0 1 0 2 0 0 1 0 0 1 1 2 3 3 1 0 0 0 0 0 1 1
0 0 0 0 0

sudanensis[2]

0 1 1 1 2 0 0 1 0 0 2 0 1 2 2 0 0 1 2 0 1 1 1 9 1 2 1 0 1 1 0 0 0 0 0 0 0 0 0 1
0 0 0 1 0 0 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 2 2 0 0 0 0 0 0 2 0 1 2 0 0 0 0 0 0 0
5 0 1 0 0 0 0 0 0 0 0 0 0 1 0 1 1 2 0 0 1 0 2 0 0 1 0 0 1 1 2 3 3 1 0 0 0 0 0 1 1
0 0 0 0 0

sudanensis[3]

0 1 1 1 2 0 0 1 0 0 2 0 1 2 2 0 0 1 2 0 1 2 1 9 1 2 1 0 1 1 0 0 0 0 0 0 0 0 0 1
0 0 0 2 0 1 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 3 2 0 0 0 0 0 0 2 0 1 2 0 0 0 0 0 0 0
5 0 1 0 0 0 0 0 0 0 0 0 0 1 0 1 1 2 0 0 1 0 2 0 0 1 0 0 1 1 2 3 3 1 0 0 0 0 0 1 1
0 0 0 0 0

sudanensis[4]

0 1 1 1 2 0 0 1 0 0 2 0 1 2 2 0 0 1 2 0 1 1 1 9 1 2 1 0 1 1 0 0 0 0 0 0 0 0 0 1
0 0 0 1 0 0 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 2 2 0 0 0 0 0 0 2 0 1 2 0 0 0 0 0 0 0
5 0 1 0 0 0 0 0 0 0 0 0 0 1 0 1 1 2 0 0 1 0 2 0 0 1 0 0 1 1 2 3 3 1 0 0 0 0 0 1 1
0 0 0 0 0

sudanensis[5]

0 1 1 1 2 0 0 1 0 0 2 0 1 2 2 0 0 1 2 0 1 1 1 9 1 2 1 0 1 1 0 0 0 0 0 0 0 0 0 1
0 0 0 1 0 0 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 2 2 0 0 0 0 0 0 2 0 1 2 0 0 0 0 0 0 0
5 0 1 0 0 0 0 0 0 0 0 0 0 1 0 1 1 2 0 0 1 0 2 0 0 1 0 0 1 1 2 3 3 1 0 0 0 0 0 1 1
0 0 0 0 0

sudanensis[6]

0 1 1 1 2 0 0 1 0 0 2 0 1 2 2 0 0 1 2 0 1 1 1 9 1 2 1 0 1 1 0 0 0 0 0 0 0 0 0 1
0 0 0 2 0 1 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 2 2 0 0 0 0 0 0 0 2 0 1 2 0 0 0 0 0 0 0 0
5 0 1 0 0 0 0 0 0 0 0 0 0 1 0 1 1 2 0 0 1 0 2 0 0 1 0 0 1 1 2 3 3 1 0 0 0 0 0 1 1
0 0 0 0 0

sudanensis[7]

0 1 1 1 2 0 0 1 0 0 2 0 1 2 2 0 0 1 2 0 1 2 1 9 1 2 1 0 1 1 0 0 0 0 0 0 0 0 0 1
0 0 0 2 0 1 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 3 2 0 0 0 0 0 0 2 0 1 2 0 0 0 0 0 0 0 0
5 0 1 0 0 0 0 0 0 0 0 0 0 1 0 1 1 2 0 0 1 0 2 0 0 1 0 0 1 1 2 3 3 1 0 0 0 0 0 1 1
0 0 0 0 0

sudanensis[8]

0 1 1 1 2 0 0 1 0 0 2 0 1 2 2 0 0 1 2 0 1 2 1 9 1 2 1 0 1 1 0 0 0 0 0 0 0 0 0 1
0 0 0 2 0 1 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 3 2 0 0 0 0 0 0 2 0 1 2 0 0 0 0 0 0 0 0
5 0 1 0 0 0 0 0 0 0 0 0 0 1 0 1 1 2 0 0 1 0 2 0 0 1 0 0 1 1 2 3 3 1 0 0 0 0 0 1 1
0 0 0 0 0

sudanensis[9]

0 1 1 1 2 0 0 1 0 0 2 0 1 2 2 0 0 1 2 0 1 2 1 9 1 2 1 0 1 1 0 0 0 0 0 0 0 0 0 1
0 0 0 2 0 1 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 3 2 0 0 0 0 0 0 2 0 1 2 0 0 0 0 0 0 0 0
5 0 1 0 0 0 0 0 0 0 0 0 0 1 0 1 1 2 0 0 1 0 2 0 0 1 0 0 1 1 2 3 3 1 0 0 0 0 0 1 1
0 0 0 0 0

sudanensis[10]

0 1 1 1 2 0 0 1 0 0 2 0 1 2 2 0 0 1 2 0 1 1 1 9 1 2 1 0 1 1 0 0 0 0 0 0 0 0 0 1
0 0 0 1 0 0 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 3 2 0 0 0 0 0 0 2 0 1 2 0 0 0 0 0 0 0 0
5 0 1 0 0 0 0 0 0 0 0 0 0 1 0 1 1 2 0 0 1 0 2 0 0 1 0 0 1 1 2 3 3 1 0 0 0 0 0 1 1
0 0 0 0 0

sudanensis[11]

0 1 1 1 2 0 0 1 0 0 2 0 1 2 2 0 0 1 2 0 1 2 1 9 1 2 1 0 1 1 0 0 0 0 0 0 0 0 0 1
0 0 0 2 0 1 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 3 2 0 0 0 0 0 0 2 0 1 2 0 0 0 0 0 0 0 0
5 0 1 0 0 0 0 0 0 0 0 0 0 1 0 1 1 2 0 0 1 0 2 0 0 1 0 0 1 1 2 3 3 1 0 0 0 0 0 1 1
0 0 0 0 0

sudanensis[12]

0 1 1 1 2 0 0 1 0 0 2 0 1 2 2 0 0 1 2 0 1 2 1 9 1 2 1 0 1 1 0 0 0 0 0 0 0 0 0 1
0 0 0 1 0 0 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 2 2 0 0 0 0 0 0 0 2 0 1 2 0 0 0 0 0 0 0 0
5 0 1 0 0 0 0 0 0 0 0 0 0 1 0 1 1 2 0 0 1 0 2 0 0 1 0 0 1 1 2 3 3 1 0 0 0 0 0 1 1

0 0 0 0 0

sudanensis[13]

0 1 1 1 2 0 0 1 0 0 2 0 1 2 2 0 0 1 2 0 1 1 1 9 1 2 1 0 1 1 0 0 0 0 0 0 0 0 0 1
0 0 0 2 0 1 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 3 2 0 0 0 0 0 0 2 0 1 2 0 0 0 0 0 0 0
5 0 1 0 0 0 0 0 0 0 0 0 1 0 1 1 2 0 0 1 0 2 0 0 1 0 0 1 1 2 3 3 1 0 0 0 0 0 1 1
0 0 0 0 0

sudanensis[14]

0 1 1 1 2 0 0 1 0 0 2 0 1 2 2 0 0 1 2 0 1 1 1 9 1 2 1 0 1 1 0 0 0 0 0 0 0 0 0 1
0 0 0 2 0 1 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 3 2 0 0 0 0 0 0 2 0 1 2 0 0 0 0 0 0 0
5 0 1 0 0 0 0 0 0 0 0 0 1 0 1 1 2 0 0 1 0 2 0 0 1 0 0 1 1 2 3 3 1 0 0 0 0 0 1 1
0 0 0 0 0

sudanensis[15]

0 1 1 1 2 0 0 1 0 0 2 0 1 2 2 0 0 1 2 0 1 2 1 9 1 2 1 0 1 1 0 0 0 0 0 0 0 0 0 1
0 0 0 2 0 1 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 3 2 0 0 0 0 0 0 2 0 1 2 0 0 0 0 0 0 0
5 0 1 0 0 0 0 0 0 0 0 0 1 0 1 1 2 0 0 1 0 2 0 0 1 0 0 1 1 2 3 3 1 0 0 0 0 0 1 1
0 0 0 0 0

sudanensis[16]

0 1 1 1 2 0 0 1 0 0 2 0 1 2 2 0 0 1 2 0 1 2 1 9 1 2 1 0 1 1 0 0 0 0 0 0 0 0 0 1
0 0 0 2 0 1 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 3 2 0 0 0 0 0 0 2 0 1 2 0 0 0 0 0 0 0
5 0 1 0 0 0 0 0 0 0 0 0 1 0 1 1 2 0 0 1 0 2 0 0 1 0 0 1 1 2 3 3 1 0 0 0 0 0 1 1
0 0 0 0 0

sudanensis[17]

0 1 1 1 2 0 0 1 0 0 2 0 1 2 2 0 0 1 2 0 1 2 1 9 1 2 1 0 1 1 0 0 0 0 0 0 0 0 0 1
0 0 0 2 0 1 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 3 2 0 0 0 0 0 0 2 0 1 2 0 0 0 0 0 0 0
5 0 1 0 0 0 0 0 0 0 0 0 1 0 1 1 2 0 0 1 0 2 0 0 1 0 0 1 1 2 3 3 1 0 0 0 0 0 1 1
0 0 0 0 0

testaceus (holotype)

0 1 1 2 2 2 0 1 2 0 2 0 1 1 1 0 0 2 2 0 1 1 0 5 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 1 0 0 0 0 0 1 0 0 0 0 2 1 1 0 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 0 0 2 0 3 2 3 0 0 0 0 1 1 1 2 1 0 0 0 0 0 1 1 1 2 0 1 0 0 0
1 0 0 0 0

testaceus[1]

0 1 1 2 2 2 0 1 2 0 2 0 1 1 1 0 0 2 2 0 1 1 0 5 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1

0 0 0 1 0 1 0 0 0 0 0 1 0 0 0 0 2 1 1 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 2 0 3 2 3 0 0 0 0 1 1 1 2 1 0 0 0 0 0 1 1 1 2 0 1 0 0 0 1 0 0 0 0

testaceus[2]

0 1 1 2 2 2 0 1 2 0 2 0 1 1 1 0 0 2 2 0 1 1 0 5 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1 0 0 0 1 0 1 0 1 0 0 1 1 0 0 0 2 1 1 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 1 2 0 3 2 3 0 0 0 0 1 1 1 2 1 0 0 0 0 0 1 1 1 2 0 1 0 0 0 1 0 0 0 0

testaceus[3]

0 1 1 2 2 2 0 1 2 0 2 0 1 1 1 0 0 2 2 0 1 1 0 5 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1 0 0 0 1 0 1 0 1 0 0 1 1 0 0 0 2 1 1 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 2 0 3 2 3 0 0 0 0 1 1 1 2 1 0 0 0 0 0 1 1 1 2 0 1 0 0 0 1 0 0 0 0

testaceus[4]

0 1 1 2 2 2 0 1 2 0 2 0 1 1 1 0 0 2 2 0 1 1 0 5 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1 0 0 0 1 0 1 0 1 0 0 1 1 0 0 0 2 1 1 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 1 2 0 3 2 3 0 0 0 0 1 1 1 2 1 0 0 0 0 0 1 1 1 2 0 1 0 0 0 1 0 0 0 0

testaceus[5]

0 1 1 2 2 2 0 1 2 0 2 0 1 1 1 0 0 2 2 0 1 1 0 5 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1 0 0 0 1 0 1 0 1 0 0 0 0 0 1 1 0 0 0 2 1 1 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 1 2 0 3 2 3 0 0 0 0 0 1 0 1 1 1 0 0 0 0 0 1 1 1 2 0 1 0 0 0 1 0 0 0 0

testaceus[6]

0 1 1 2 2 2 0 1 2 0 2 0 1 1 1 0 0 2 2 0 1 1 0 5 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1 0 0 0 1 0 1 0 1 0 0 1 1 0 0 0 2 1 1 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 2 0 3 2 3 0 0 0 0 0 1 0 1 1 1 0 0 0 0 0 1 1 1 2 0 1 0 0 0 1 0 0 0 0

testaceus[7]

0 1 1 2 2 2 0 1 2 0 2 0 1 1 1 0 0 2 2 0 1 1 0 5 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1 0 0 0 1 0 1 0 1 0 0 0 0 0 1 1 0 0 0 2 1 1 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 2 0 3 2 3 0 0 0 0 0 1 0 1 1 1 0 0 0 0 0 1 1 1 2 0 1 0 0 0 1 0 0 0 0

testaceus[8]

0 1 1 2 2 2 0 1 2 0 2 0 1 1 1 0 0 2 2 0 1 1 0 5 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 1 0 0 0 0 0 1 0 0 0 0 2 1 1 0 0 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 0 0 2 0 3 2 3 0 0 0 0 1 1 1 2 1 0 0 0 0 0 1 1 1 2 0 1 0 0 0
1 0 0 0 0

testaceus[9]

0 1 1 2 2 2 0 1 2 0 2 0 1 1 1 0 0 2 2 0 1 1 0 5 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 1 0 1 0 0 1 1 0 0 0 2 1 1 0 0 0 1 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 0 0 2 0 3 2 3 0 0 0 0 1 1 1 2 1 0 0 0 0 0 1 1 1 2 0 1 0 0 0
1 0 0 0 0

testaceus[10]

0 1 1 2 2 2 0 1 2 0 2 0 1 1 1 0 0 2 2 0 1 1 0 5 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 1 0 1 0 0 1 1 0 0 0 2 1 1 0 0 0 1 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 0 0 2 0 3 2 3 0 0 0 0 1 1 1 2 1 0 0 0 0 0 1 1 1 2 0 1 0 0 0
1 0 0 0 0

testaceus[11]

0 1 1 2 2 2 0 1 2 0 2 0 1 1 1 0 0 2 2 0 1 1 0 5 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 1 0 1 0 0 1 1 0 0 0 2 1 1 0 0 0 1 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 0 0 2 0 3 2 3 0 0 0 0 1 1 1 2 1 0 0 0 0 0 1 1 1 2 0 1 0 0 0
1 0 0 0 0

testaceus[12]

0 1 1 2 2 2 0 1 2 0 2 0 1 1 1 0 0 2 2 0 1 1 0 5 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 1 0 1 0 0 1 1 0 0 0 2 1 1 0 0 0 1 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 0 0 2 0 3 2 3 0 0 0 0 1 1 1 2 1 0 0 0 0 0 1 1 1 2 0 1 0 0 0
1 0 0 0 0

testaceus[13]

0 1 1 2 2 2 0 1 2 0 2 0 1 1 1 0 0 2 2 0 1 1 0 5 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 1 0 1 0 0 1 1 0 0 0 2 1 1 0 0 0 1 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 0 0 2 0 3 2 3 0 0 0 0 1 1 1 2 1 0 0 0 0 0 1 1 1 2 0 1 0 0 0
1 0 0 0 0

testaceus[14]

0 1 1 2 2 2 0 1 2 0 2 0 1 1 1 0 0 2 2 0 1 1 0 5 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 1 0 1 0 0 1 1 0 0 0 2 1 1 0 0 0 1 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 0 0 2 0 3 2 3 0 0 0 0 1 1 1 2 1 0 0 0 0 0 1 1 1 2 0 1 0 0 0

1 0 0 0 0

tharensis (paratype)

0 1 1 2 2 1 1 2 2 0 2 0 1 2 1 0 0 2 2 0 1 1 1 6 0 2 1 0 1 1 0 0 2 0 0 0 0 0 0 1
0 0 0 1 0 1 1 0 0 1 0 1 1 0 0 1 0 0 1 0 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 0 0 1 0 2 2 3 0 0 0 0 0 1 0 1 0 0 0 0 1 4 0 1 0 1 0 0 0 1 1
0 1 0 0 0

thisbe (lectotype)

1 1 1 1 1 1 1 2 1 0 2 0 1 2 2 0 2 2 2 0 1 2 1 9 3 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 0 0 0 0 0 0 1 1 0 0 1 0 0 1 1 0 3 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 1 2 1 2 1 2 0 0 0 3 1 0 1 1 0 0 0 0 1 0 0 0 0 1 0 0 0 0 1
2 0 0 0 0

thisbe (paralectotype)

1 1 1 1 1 1 1 2 1 0 2 0 1 2 2 0 2 2 2 0 1 2 1 9 3 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 0 0 0 0 0 0 1 1 0 0 1 0 0 1 1 0 3 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 1 2 1 2 1 2 0 0 0 3 1 0 1 1 0 0 0 0 1 0 0 0 0 1 0 0 0 0 1
2 0 0 0 0

thisbe[1]

1 1 1 1 1 1 1 2 1 0 2 0 1 2 2 0 2 2 2 0 1 2 1 9 3 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 0 0 0 0 0 0 1 1 0 0 1 0 0 1 1 0 3 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 1 2 1 2 1 2 0 0 0 3 1 0 0 1 0 0 0 0 1 0 0 0 0 1 0 0 0 0 1
2 0 0 0 0

thisbe[2]

1 1 1 1 1 1 1 2 1 0 2 0 1 2 2 0 2 2 2 0 1 2 1 9 3 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 0 0 0 0 0 0 1 1 0 0 1 0 0 1 1 0 3 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 1 2 1 2 1 2 0 0 0 3 1 0 1 1 0 0 0 0 1 0 0 0 0 1 0 0 0 0 1
2 0 0 0 0

thisbe[3]

1 1 1 1 1 1 1 2 1 0 2 0 1 2 2 0 2 2 2 0 1 2 1 9 3 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 0 0 0 0 0 0 1 1 0 0 1 0 0 1 1 0 3 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 1 2 1 2 1 2 0 0 0 3 1 0 0 1 0 0 0 0 1 0 0 0 0 1 0 0 0 0 1
2 0 0 0 0

thisbe[4]

1 1 1 1 1 1 1 2 1 0 2 0 1 2 2 0 2 2 2 0 1 2 1 9 3 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 0 0 0 0 0 0 1 1 0 0 1 0 0 1 1 0 3 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 1 2 1 2 1 2 0 0 0 3 1 0 0 1 0 0 0 0 1 0 0 0 0 1 0 0 0 0 1
2 0 0 0 0

thisbe[5]

1 1 1 1 1 1 1 2 1 0 2 0 1 2 2 0 2 2 2 0 1 2 1 9 3 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 0 0 0 0 0 0 1 1 0 0 1 0 0 1 1 0 3 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 1 2 1 2 1 2 0 0 0 3 1 0 0 1 0 0 0 0 1 0 0 0 0 1 0 0 0 0 1
2 0 0 0 0

thisbe[6]

1 1 1 1 1 1 1 2 1 0 2 0 1 2 2 0 2 2 2 0 1 2 1 9 3 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 0 0 0 0 0 0 1 1 0 0 1 0 0 1 1 0 3 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 1 2 1 2 1 2 0 0 0 3 1 0 0 1 0 0 0 0 1 0 0 0 0 1 0 0 0 0 1
2 0 0 0 0

thisbe[7]

1 1 1 1 1 1 1 2 1 0 2 0 1 2 2 0 2 2 2 0 1 2 1 9 3 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 0 0 0 0 0 0 1 1 0 0 1 0 0 1 1 0 3 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 1 2 1 2 1 2 0 0 0 3 1 0 1 1 0 0 0 0 1 0 0 0 0 1 0 0 0 0 1
2 0 0 0 0

thisbe[8]

1 1 1 1 1 1 1 2 1 0 2 0 1 2 2 0 2 2 2 0 1 2 1 9 3 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 0 0 0 0 0 0 1 1 0 0 1 0 0 1 1 0 3 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 1 2 1 2 1 2 0 0 0 3 1 0 1 1 0 0 0 0 1 0 0 0 0 1 0 0 0 0 1
2 0 0 0 0

thisbe[9]

1 1 1 1 1 1 1 2 1 0 2 0 1 2 2 0 2 2 2 0 1 2 1 9 3 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 0 0 0 0 0 0 1 1 0 0 1 0 0 1 1 0 3 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 1 2 1 2 1 2 0 0 0 3 1 0 1 1 0 0 0 0 1 0 0 0 0 1 0 0 0 0 1
2 0 0 0 0

thisbe[10]

1 1 1 1 1 1 1 2 1 0 2 0 1 2 2 0 2 2 2 0 1 2 1 9 3 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 0 0 0 0 0 0 1 1 0 0 1 0 0 1 1 0 3 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 1 2 1 2 1 2 0 0 0 3 1 0 1 1 0 0 0 0 1 0 0 0 0 1 0 0 0 0 1

2 0 0 0 0

thisbe[11]

1 1 1 1 1 1 1 2 1 0 2 0 1 2 2 0 2 2 2 0 1 2 1 9 3 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 0 0 0 0 0 0 1 1 0 0 1 0 0 1 1 0 3 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 1 2 1 2 1 2 0 0 0 3 1 0 1 1 0 0 0 0 1 0 0 0 0 1 0 0 0 0 1
2 0 0 0 0

thisboides (holotype)

0 1 1 2 1 1 0 1 1 0 2 0 1 2 2 0 0 2 2 0 1 2 2 9 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 0 0 0 0 0 0 1 1 0 2 3 0 0 1 1 0 2 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 3 1 3 0 0 0 0 2 0 1 1 1 0 0 0 0 2 0 0 0 1 0 0 1 0 1
1 0 0 0 1

thisboides (paratype)[1]

0 1 1 2 1 1 0 1 1 0 2 0 1 2 2 0 0 2 2 0 1 2 2 9 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 0 0 0 0 0 0 1 1 0 2 3 0 0 1 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 3 1 3 0 0 0 0 2 0 0 1 0 0 0 0 0 2 0 0 0 1 0 0 1 0 1
1 0 0 0 1

thisboides (paratype)[2]

0 1 1 2 1 1 0 1 1 0 2 0 1 2 2 0 0 2 2 0 1 2 2 9 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 0 0 0 0 0 0 1 1 0 2 3 0 0 1 1 0 2 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 3 1 3 0 0 0 0 2 0 1 1 1 0 0 0 0 2 0 0 0 1 0 0 1 0 1
1 0 0 0 1

thisboides (paratype)[3]

0 1 1 2 1 1 0 1 1 0 2 0 1 2 2 0 0 2 2 0 1 2 2 9 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 0 0 0 0 0 0 1 1 0 2 3 0 0 1 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 3 1 3 0 0 0 0 2 0 0 1 0 0 0 0 0 2 0 0 0 1 0 0 1 0 1
1 0 0 0 1

thisboides (paratype)[4]

0 1 1 2 1 1 0 1 1 0 2 0 1 2 2 0 0 2 2 0 1 2 2 9 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 0 0 0 0 0 0 1 1 0 2 3 0 0 1 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 3 1 3 0 0 0 0 2 0 0 1 0 0 0 0 0 2 0 0 0 1 0 0 1 0 1
1 0 0 0 1

thisboides (paratype)[5]

0 1 1 2 1 1 0 1 1 0 2 0 1 2 2 0 0 2 2 0 1 2 2 9 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1

0 0 0 1 0 0 0 0 0 0 0 1 1 0 2 3 0 0 1 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 8 0 0 0 0 0 0 0 0 0 0 0 1 0 1 2 0 0 0 0 2 0 0 1 0 0 0 0 0 2 0 0 0 1 0 0 1 0 1 1 0 0 0 1

thisboides (paratype)[6]

0 1 1 2 1 1 0 1 1 0 2 0 1 2 2 0 0 2 2 0 1 2 2 9 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1 0 0 0 1 0 0 0 0 0 0 0 1 1 0 2 3 0 0 1 1 0 2 1 0 0 0 0 0 0 0 0 0 0 0 0 8 0 0 0 0 0 0 0 0 0 0 0 1 0 1 2 0 0 0 0 2 0 0 1 0 0 0 0 0 2 0 0 0 1 0 0 1 0 1 1 0 0 0 1

thisboides (paratype)[7]

0 1 1 2 1 1 0 1 1 0 2 0 1 2 2 0 0 2 2 0 1 2 2 9 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1 0 0 0 1 0 0 0 0 0 0 0 1 1 0 2 3 0 0 1 1 0 2 1 0 0 0 0 0 0 0 0 0 0 0 0 8 0 0 0 0 0 0 0 0 0 0 0 1 0 3 1 3 0 0 0 0 2 0 1 1 1 0 0 0 0 2 0 0 0 1 0 0 1 0 1 1 0 0 0 1

thisboides (paratype)[8]

0 1 1 2 1 1 0 1 1 0 2 0 1 2 2 0 0 2 2 0 1 2 2 9 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1 0 0 0 1 0 0 0 0 0 0 0 1 1 0 2 3 0 0 1 1 0 2 1 0 0 0 0 0 0 0 0 0 0 0 0 8 0 0 0 0 0 0 0 0 0 0 0 1 0 1 2 0 0 0 0 2 0 0 1 0 0 0 0 0 2 0 0 0 1 0 0 1 0 1 1 0 0 0 1

thisboides (paratype)[9]

0 1 1 2 1 1 0 1 1 0 2 0 1 2 2 0 0 2 2 0 1 2 2 9 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1 0 0 0 1 0 0 0 0 0 0 0 1 1 0 2 3 0 0 1 1 0 2 1 0 0 0 0 0 0 0 0 0 0 0 0 8 0 0 0 0 0 0 0 0 0 0 0 1 0 3 1 3 0 0 0 0 2 0 0 1 0 0 0 0 0 2 0 0 0 1 0 0 1 0 1 1 0 0 0 1

thisboides (paratype)[10]

0 1 1 2 1 1 0 1 1 0 2 0 1 2 2 0 0 2 2 0 1 2 2 9 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1 0 0 0 1 0 0 0 0 0 0 0 1 1 0 2 3 0 0 1 1 0 2 1 0 0 0 0 0 0 0 0 0 0 0 0 8 0 0 0 0 0 0 0 0 0 0 0 1 0 3 1 3 0 0 0 0 2 0 1 1 1 0 0 0 0 2 0 0 0 1 0 0 1 0 1 1 0 0 0 1

thisboides (paratype)[11]

0 1 1 2 1 1 0 1 1 0 2 0 1 2 2 0 0 2 2 0 1 2 2 9 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1 0 0 0 1 0 0 0 0 0 0 0 1 1 0 2 3 0 0 1 1 0 2 1 0 0 0 0 0 0 0 0 0 0 0 0 8 0 0 0 0 0 0 0 0 0 0 0 1 0 1 2 0 0 0 0 2 0 0 1 0 0 0 0 0 2 0 0 0 1 0 0 1 0 1 1 0 0 0 1

thisboides (paratype)[12]

0 1 1 2 1 1 0 1 1 0 2 0 1 2 2 0 0 2 2 0 1 2 2 9 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 0 0 0 0 0 0 1 1 0 2 3 0 0 1 1 0 2 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 0 1 0 3 1 3 0 0 0 0 2 0 1 1 1 0 0 0 0 2 0 0 0 1 0 0 1 0 1
1 0 0 0 1

thisboides (paratype)[13]

0 1 1 2 1 1 0 1 1 0 2 0 1 2 2 0 0 2 2 0 1 2 2 9 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 0 0 0 0 0 0 1 1 0 2 3 0 0 1 1 0 2 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 0 1 0 3 1 3 0 0 0 0 2 0 1 1 1 0 0 0 0 2 0 0 0 1 0 0 1 0 1
1 0 0 0 1

tortilis (holotype)

0 1 1 1 2 2 0 1 1 0 2 0 1 2 2 0 0 2 2 1 1 2 1 2 0 1 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 2 0 1 0 0 0 0 1 1 0 1 0 1 0 0 0 0 0 3 2 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 0 2 2 2 4 2 3 0 0 0 0 0 1 1 1 1 0 0 1 1 0 1 0 1 2 0 1 0 0 0
1 0 0 0 0

tortilis (paratype)[1]

0 1 1 1 2 2 0 1 1 0 2 0 1 2 2 0 0 2 2 1 1 2 1 2 0 1 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 2 0 1 0 0 0 0 1 1 0 1 0 1 0 0 0 0 0 3 2 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 0 2 2 2 4 2 3 0 0 0 0 1 1 2 1 0 0 1 1 0 1 0 1 2 0 1 0 0 0
1 0 0 0 0

tortilis (paratype)[2]

0 1 1 1 2 2 0 1 1 0 2 0 1 2 2 0 0 2 2 1 1 2 1 2 0 1 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 2 0 1 0 0 0 0 1 1 0 1 0 1 0 0 0 0 0 3 2 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 0 2 2 2 4 2 3 0 0 0 0 1 1 2 1 0 0 1 1 0 1 0 1 2 0 1 0 0 0
1 0 0 0 0

tortilis (paratype)[3]

0 1 1 1 2 2 0 1 1 0 2 0 1 2 2 0 0 2 2 1 1 2 1 2 0 1 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 2 0 0 0 0 0 0 0 1 0 1 0 1 0 0 0 0 0 2 2 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 0 2 2 2 4 2 3 0 0 0 0 1 1 2 1 0 0 1 1 0 1 0 1 2 0 1 0 0 0
1 0 0 0 0

tortilis (paratype)[4]

0 1 1 1 2 2 0 1 1 0 2 0 1 2 2 0 0 2 2 1 1 2 1 2 0 1 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 2 0 1 0 0 0 0 1 1 0 1 0 1 0 0 0 0 0 3 2 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0

8 0 0 0 0 0 0 0 0 0 0 0 1 2 2 4 2 3 0 0 0 0 1 1 2 1 0 0 1 1 0 1 0 1 2 0 1 0 0 0 1 0 0 0 0

tortilis (paratype)[5]

0 1 1 1 2 2 0 1 1 0 2 0 1 2 2 0 0 2 2 1 1 2 1 2 0 1 1 0 1 1 0 1 1 0 0 0 0 0 1 0 0 0 2 0 1 0 0 0 0 1 1 0 1 0 1 0 0 0 0 0 3 2 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 8 0 0 0 0 0 0 0 0 0 0 0 2 2 2 4 2 3 0 0 0 0 1 1 2 1 0 0 1 1 0 1 0 1 2 0 1 0 0 0 1 0 0 0 0

tortilis (paratype)[6]

0 1 1 1 2 2 0 1 1 0 2 0 1 2 2 0 0 2 2 1 1 2 1 2 0 1 1 0 1 1 0 1 1 0 0 0 0 0 1 0 0 0 2 0 1 0 0 0 0 1 0 1 0 1 0 0 0 0 0 2 2 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 8 0 0 0 0 0 0 0 0 0 0 0 2 2 2 4 2 3 0 0 0 0 1 1 2 1 0 0 1 1 0 1 0 1 2 0 1 0 0 0 1 0 0 0 0

tortilis (paratype)[7]

0 1 1 1 2 2 0 1 1 0 2 0 1 2 2 0 0 2 2 1 1 2 1 2 0 1 1 0 1 1 0 1 1 0 0 0 0 0 1 0 0 0 2 0 1 0 0 0 0 1 1 0 1 0 1 0 0 0 0 0 3 2 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 8 0 0 0 0 0 0 0 0 0 0 0 1 2 2 4 2 3 0 0 0 0 1 1 1 1 0 0 1 1 0 1 0 1 2 0 1 0 0 0 1 0 0 0 0

tortilis (paratype)[8]

0 1 1 1 2 2 0 1 1 0 2 0 1 2 2 0 0 2 2 1 1 2 1 2 0 1 1 0 1 1 0 1 1 0 0 0 0 0 1 0 0 0 2 0 0 0 0 0 0 0 1 1 0 1 0 1 0 0 0 0 0 3 2 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 8 0 0 0 0 0 0 0 0 0 0 0 2 2 2 4 2 3 0 0 0 0 1 1 2 1 0 0 1 1 0 1 0 1 2 0 1 0 0 0 1 0 0 0 0

trochantalis (holotype)

0 1 1 2 2 0 0 1 1 0 2 0 1 2 2 0 0 1 2 0 1 2 1 9 0 2 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 2 0 1 1 0 0 0 1 0 0 0 0 2 2 0 0 0 0 0 0 2 0 1 1 0 0 0 0 0 0 5 0 1 0 0 0 0 0 0 0 0 1 0 1 0 1 1 2 0 0 0 0 0 0 0 0 1 0 0 0 1 2 2 3 1 0 2 0 0 0 1 1 0 0 0 0 0

APPENDIX IX. Data matrix for final phenetic analysis of 52 species of *Tricholabiodes* using the coded characters as in Appendix VI. The state for each character for each OTU was based on a hypothetical specimen typical of the species. All specimens measured previously within each OTU were used to calculate an average value for each character, which was rounded off to the nearest whole number. The first variable is 0 and the last is 124.

beludzhistanus

0 1 1 2 2 2 0 1 2 0 2 0 1 2 1 0 0 2 2 0 1 1 1 6 0 2 1 0 1 1 0 0 1 0 0 0 0 0 0 0 0 2 1 1 1 0 0 1 2 3 1 1 2 3 1 0 1 0 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 8 0 0 0 0 0 0 0 0 0 0 1 1 2 0 3 2 3 0 0 0 0 2 2 2 1 0 0 0 1 4 0 0 0 1 0 0 1 1 1 0 1 0 0 0

niloticus

0 1 1 1 2 0 0 1 2 0 2 0 1 2 1 0 0 2 2 0 1 2 1 7 0 2 1 0 1 1 0 0 2 0 0 0 0 0 0 0 1 0 0 0 1 0 1 0 0 0 0 0 0 0 0 0 1 1 0 2 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 8 0 0 0 0 0 0 0 0 0 0 1 0 1 1 3 2 2 0 0 0 1 2 1 1 1 1 1 0 0 0 2 4 0 0 2 2 0 3 1 1 1 0 0 0 0 0

indistinctus

0 0 1 2 2 2 0 2 2 0 2 0 1 2 1 0 0 2 2 0 1 2 2 8 0 2 1 0 1 0 0 0 2 0 0 0 0 0 0 1 0 0 0 1 0 1 1 0 0 0 1 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 0 0 0 1 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 1 1

00000

arabicus

0112100120 2012100220 1127021011 0010000001
0001111000 0210010010 1220000000 0000000000
9000000100 1010122000 1211100001 2002202001
00000

pallidicornis

0112220110 2012100120 1007021011 0010000001
0002000001 0100010010 0220000000 0000000010
8000110000 1010212000 0000100001 1012202111
00000

pallidior

0111200110 2011000221 1215021011 0110000001
0002011000 0110240010 0001020000 0000000000
8000000000 0231323000 0011100012 0101201000
10001

tortilis

0111220110 2012200221 1212011011 0110000001
0002010000 1101010000 0321010000 0000000000
8000000000 0222423000 0011210011 0101201000
10000

petiolatus

0110220110 2011100220 1002021011 0110000001
0002010000 0100010000 0001020000 0000000000
8000000000 1222423000 0022210011 0101201000
10001

imbellis

0111200110 2011100220 1212321011 0110000001

0 0 0 2 0 1 0 1 0 0 0 0 0 2 0 1 0 0 1 0 0 1 0 1 0 2 0 0 0 0 0 0 0 0 0 1 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 1 2 2 4 2 3 0 0 0 0 0 0 1 2 2 1 0 0 2 0 0 1 0 1 2 0 1 0 0 0
1 0 0 0 0

lividus

0 1 1 2 2 2 0 1 0 0 2 0 1 1 1 0 0 1 2 1 1 1 3 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 0 0
0 0 0 2 1 1 1 0 0 0 1 1 0 0 0 0 1 0 0 0 0 0 1 1 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 0 0 1 2 4 2 3 0 0 0 0 0 1 1 2 1 0 0 0 2 0 1 0 1 2 0 1 0 0 0
1 0 0 1 1

inornatus

0 1 1 2 2 2 0 1 1 0 2 0 1 1 2 0 0 1 2 1 1 2 1 5 3 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 1 0 1 0 0 0 1 0 0 0 0 1 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 1 0 1 2 4 2 3 0 0 0 0 0 0 1 0 2 1 0 0 1 0 3 2 0 1 2 0 1 0 0 0
1 0 0 0 0

testaceus

0 1 1 2 2 2 0 1 2 0 2 0 1 1 1 0 0 2 2 0 1 1 0 5 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 1 0 1 0 0 1 1 0 0 0 2 1 1 0 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 0 0 2 0 3 2 3 0 0 0 0 1 1 1 2 1 0 0 0 0 0 1 1 1 2 0 1 0 0 0
1 0 0 0 0

acer

0 1 1 2 2 0 0 0 1 0 2 0 1 1 1 0 0 2 2 0 1 1 1 2 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 0 0 1 0 0 1 1 0 0 0 0 1 0 0 1 0 0 1 2 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 0 0 1 0 2 1 2 0 0 0 0 2 1 1 1 0 0 0 1 0 0 1 0 1 2 0 1 0 0 0
1 0 0 0 0

concavus

0 1 1 1 2 2 0 1 1 0 2 0 1 1 1 0 0 1 2 0 1 1 1 3 3 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 2 0 1 0 0 0 1 0 1 1 0 2 3 0 0 0 0 0 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 1 2 1 3 1 2 0 0 0 0 0 2 1 1 2 1 0 0 0 0 0 1 2 0 1 2 0 1 0 0 0
1 0 0 0 1

denticulatus

0 1 1 1 0 0 0 1 1 1 2 2 1 1 1 0 1 1 1 0 0 1 1 3 3 2 1 0 1 1 0 1 1 0 1 0 0 0 0 0
0 1 0 1 0 1 0 1 1 0 2 2 1 2 1 4 1 2 1 1 0 3 2 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 0 1 1 3 1 3 0 0 0 0 0 1 1 1 0 0 0 0 0 0 0 1 2 0 1 0 0 0
1 0 0 0 0

mandibularis

0 1 1 1 1 0 0 0 0 1 2 1 1 1 1 0 0 1 2 0 1 1 1 1 2 0 0 0 1 1 1 1 0 2 0 0 0 0 0 0 0
1 0 0 1 0 0 1 0 0 0 0 0 0 1 1 3 1 0 1 1 0 3 2 0 0 0 0 0 0 2 1 0 1 0 1 0 1 0 0 0
9 0 0 1 0 0 0 1 0 0 1 1 2 0 2 2 2 1 0 0 1 2 0 0 1 1 0 0 0 2 4 0 0 0 1 0 0 1 1 1
0 0 1 1 1

disgregus

0 1 1 0 1 0 0 2 0 2 2 2 1 1 1 1 0 1 1 0 0 1 1 0 4 3 2 0 2 1 0 1 1 1 0 0 0 1 0 1
2 0 0 1 0 0 0 0 0 0 0 2 2 1 1 0 1 0 0 1 1 1 0 0 1 0 0 0 1 0 0 1 0 0 0
1 1 1 0 0 0 0 0 0 0 0 0 1 2 1 3 1 2 0 0 0 0 0 1 0 0 1 0 1 2 1 1 0 0 1 0 1 0 0 0
1 0 0 2 1

thisbe

1 1 1 1 1 1 1 2 1 0 2 0 1 2 2 0 2 2 2 2 0 1 2 1 9 3 2 1 0 1 1 0 1 1 0 0 0 0 0 1
0 0 0 1 0 0 0 0 0 0 0 1 1 0 0 1 0 0 1 1 0 3 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 1 2 1 2 1 2 0 0 0 3 1 0 1 1 0 0 0 0 1 0 0 0 0 1 0 0 0 0 1
2 0 0 0 0

thisboides

0 1 1 2 1 1 0 1 1 0 2 0 1 2 2 0 0 2 2 0 1 2 2 9 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 1 0 0 0 0 0 0 0 1 1 0 2 3 0 0 1 1 0 2 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 3 1 3 0 0 0 0 2 0 1 1 1 0 0 0 0 2 0 0 0 1 0 0 1 0 1
1 0 0 0 1

alveolus

0 1 1 1 2 0 0 0 1 0 2 0 1 2 2 0 0 2 2 0 1 2 1 9 0 2 0 0 1 1 0 1 1 0 0 0 0 0 0 1
0 0 0 2 0 1 0 0 0 0 0 1 1 1 0 2 1 0 1 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 1 3 0 0 0 0 2 1 1 1 0 0 0 0 0 2 0 0 0 0 0 0 1 1 1

00000

paulocellatus

0101000100 2012200220 0004021011 0110000000
1001001000 0110140011 0220000000 0000000000
8000000000 0010122000 0211100002 2000100111
10001

longicarinatus

0112211110 2102200220 1219321011 0110000011
1001000000 0011241011 0310000000 0000000000
9000000000 0231313001 0321200002 2000100111
00001

bactrianus

0111200110 2012100220 1229021011 0110000001
0011001001 0101010011 1110000000 0000000000
8002000200 1122423000 0022210001 4000100111
00100

garamantis

0111222211 2212100220 1219021011 0010000001
0002010000 0110010010 0220000000 0000000000
8000000000 0011323000 0022210001 0000100110
00000

carinifer

1111112110 2012200120 1219321011 0110000011
1001010000 0010010011 0321000000 0000000000
11000000000 0111322001 0211100012 3010100011
00000

andrei

0001000102 0102200010 1004121011 0110000001

1 0 0 1 0 0 0 0 0 0 0 1 1 0 0 1 0 0 1 1 0 3 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 9 0 0 0 0 0 0 0 0 0 0 0 1 1 0 1 0 0 0 0 1 2 1 1 1 0 0 0 0 1 2 0 0 0 1 0 0 0 0 1 0 0 0 1 1

stigmaticus

1 1 1 2 0 0 0 1 1 0 2 0 1 2 2 0 0 2 2 0 1 2 1 4 1 1 0 0 1 1 0 1 1 0 0 0 0 0 1 0 0 0 1 0 1 0 0 0 0 0 1 1 1 3 1 0 1 1 1 1 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 1 3 0 0 0 1 2 1 1 1 0 0 0 1 2 0 0 0 1 0 0 0 1 1 0 0 0 0 1

recurvatus

0 1 1 2 2 2 2 1 0 2 0 1 2 1 0 0 2 2 0 1 2 1 6 0 2 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 1 0 0 0 0 0 0 1 0 0 2 4 0 0 1 0 1 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 9 0 0 0 0 0 0 2 0 0 1 0 1 0 2 1 2 0 0 0 0 0 0 0 0 1 1 0 0 0 0 2 3 0 0 0 2 0 0 1 1 1 0 0 1 0 0

saharicus

0 1 1 1 1 0 0 1 1 0 2 0 1 2 1 0 0 2 2 0 1 1 1 1 0 2 0 0 1 1 0 0 2 0 0 0 0 0 0 1 0 0 0 2 0 1 0 0 0 1 1 1 1 0 0 1 0 0 1 0 1 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 1 1 2 1 3 1 2 0 0 0 0 0 1 1 2 1 0 0 0 2 3 0 1 0 2 1 2 1 1 1 0 0 1 0 0

tharensis

0 1 1 2 2 1 1 2 2 0 2 0 1 2 1 0 0 2 2 0 1 1 1 6 0 2 1 0 1 1 0 0 2 0 0 0 0 0 0 1 0 0 0 1 0 1 1 0 0 1 0 0 1 0 1 1 1 0 0 0 1 0 0 1 0 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 1 0 2 2 3 0 0 0 0 0 1 0 1 0 0 0 0 1 4 0 1 0 1 0 0 0 1 1 0 1 0 0 0

pedunculatoides

0 1 1 1 2 0 0 1 0 0 2 0 1 2 1 0 0 2 2 0 1 2 1 1 0 1 2 1 0 1 0 1 0 0 0 0 0 0 0 0 1 1 0 0 1 0 0 0 1 0 0 1 0 0 0 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 3 2 0 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 4 0 1 0 0 0 0 0 0 0 0 1 0 1 1 0 1 2 0 0 0 0 2 1 0 1 0 0 0 0 2 0 1 0 2 0 0 0 1 1 0 0 0 0 0

parallelus

0 1 1 2 2 0 0 1 0 0 2 0 1 2 1 0 0 2 2 0 1 2 1 9 0 2 1 0 1 1 0 0 0 0 0 0 0 0 0 1
1 0 0 1 0 0 1 1 0 0 0 1 1 1 2 4 0 0 1 0 0 1 1 1 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0
6 0 0 0 0 0 0 0 0 0 0 1 0 1 1 3 2 3 0 0 0 0 2 1 1 1 0 0 0 0 1 2 0 1 0 2 0 0 0 1 1
0 0 0 0 0

nonveilleri

0 1 1 1 2 0 0 1 0 0 2 0 1 2 2 0 0 2 2 0 1 1 1 9 1 2 1 0 1 1 0 0 1 0 0 0 0 0 0 0
0 0 0 1 0 1 0 0 0 0 0 1 1 0 0 1 0 0 1 1 0 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1
2 0 0 0 0 0 0 0 0 0 0 1 0 1 1 3 2 3 2 0 0 0 2 0 0 1 0 0 1 0 1 2 0 1 0 1 1 1 0 1 1
0 0 1 0 0

sinuatus

0 1 1 1 2 0 0 1 0 0 2 0 1 2 2 0 0 1 2 0 1 2 1 1 0 0 2 1 0 1 1 0 0 0 0 0 0 0 0 1
0 0 1 1 0 0 0 0 0 0 0 0 1 1 0 1 0 0 1 0 0 3 2 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 1 0 0
4 0 1 0 0 0 0 0 1 1 1 0 1 0 1 1 3 0 0 1 0 2 1 1 2 0 0 0 0 1 3 2 1 0 2 0 0 0 1 1
0 0 0 0 0

marmaricus

1 0 0 2 0 0 0 1 1 0 2 0 1 2 2 0 0 2 2 1 1 1 1 4 0 2 1 0 1 1 0 0 1 0 0 0 0 0 0 0
0 0 0 2 0 0 0 0 1 0 1 1 0 1 0 1 0 0 1 0 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0
5 0 0 0 0 0 0 0 0 0 0 1 1 2 1 2 2 2 0 0 0 0 0 1 1 2 0 0 0 0 1 2 0 2 1 2 1 0 0 0 1
0 0 0 0 0

nursei

0 1 1 2 1 0 0 1 0 0 2 0 1 2 2 0 0 2 2 0 1 0 0 6 0 2 1 0 1 1 0 0 2 0 0 0 0 0 0 1
1 0 0 1 0 1 1 0 0 0 0 1 0 0 1 3 0 0 1 0 0 1 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 2 0 0 0 0 0 0 0 1 2 1 3 1 3 0 1 1 1 0 0 0 1 0 0 0 1 1 2 0 0 0 1 0 0 1 1
0 1 0 0 0

convexus

1 1 1 2 1 1 2 1 0 0 2 0 1 0 1 0 0 2 2 0 1 2 1 9 3 2 1 0 1 1 0 1 1 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 1 1 0 2 3 1 0 1 1 0 2 1 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0
0 0 0 0 0 0 0 0 0 0 0 1 1 1 3 1 3 0 0 0 0 2 1 1 1 0 0 0 0 2 0 2 0 1 0 0 2 0 1

00001

nodosus

0111000111 1100101210 0218321011 0110100000
0102010110 2200010000 0320000000 0000000000
1100000000000 0011413000 0001010000 1001201000
10000

sudanensis

0111200100 2012200120 1219121011 0000000001
0002010000 0010010010 0320000002 0120000000
5010000000 0010112001 0200100112 3310000011
00000

femoralis

0112220110 2012200220 1119221011 0000000001
0001000001 1200130011 0221000002 0100000000
5010000000 1010102000 0201000001 3300200111
00000

trochantalis

0112200110 2012200120 1219021011 0000000000
0002011000 0100231010 0220000002 0110000000
5010000000 1010112000 0000100012 2310200011
00000

pedunculatus

0112200110 2012100210 1219021011 0000000001
1002010100 0110131010 0110000000 0000000000
5010000000 0010123000 0000210002 3310200011
00000

palaestinensis

1102220101 1202100220 1219021010 0000000001

1 0 0 2 0 1 0 0 0 0 0 1 1 0 0 1 0 0 1 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0
5 0 1 0 0 0 0 0 0 0 0 1 0 1 0 1 2 3 0 0 1 0 0 1 1 2 1 0 0 1 2 3 3 1 0 2 0 0 0 1 1
0 0 0 0 0

protuberans

0 1 1 2 2 0 0 1 0 0 2 0 1 2 2 2 0 0 2 2 0 1 0 0 9 3 0 0 0 1 1 0 0 0 0 0 0 0 0 0
0 0 1 1 0 0 0 0 0 0 0 1 1 0 0 1 0 0 1 1 0 2 2 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0
3 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 2 0 0 1 0 2 0 0 0 0 0 0 2 3 1 1 0 2 0 0 0 1 1
0 0 0 0 0

chloroticus

0 1 1 1 2 2 0 1 1 0 2 0 1 2 2 2 0 0 2 2 0 1 2 2 9 0 2 1 0 1 0 0 0 0 0 0 0 0 0 1
0 0 1 2 1 0 0 0 0 0 0 1 0 0 1 3 0 0 1 0 0 0 0 0 0 0 0 0 0 1 1 0 0 0 1 0 0 0
1 2 0 1 0 0 0 0 2 1 0 2 0 1 0 1 2 2 0 0 0 0 0 1 1 2 1 0 0 1 1 2 3 0 0 2 0 0 0 1 1
0 0 0 0 0

brothersi

0 1 1 2 2 0 0 0 1 2 1 2 0 2 2 0 0 1 1 0 0 0 1 1 1 0 0 0 0 0 2 0 0 1 0 0 1 1 0 0 1
0 0 0 0 0 0 0 0 1 0 1 0 1 0 0 1 3 0 0 1 1 1 2 2 2 0 0 0 0 1 1 0 0 0 0 0 0 1 0 0 0
4 0 0 2 0 0 1 0 0 0 2 0 1 1 2 2 2 2 0 0 0 2 1 1 0 0 0 0 0 3 5 0 0 0 1 0 1 0 1 1
0 0 1 0 0

asiaticus

0 1 1 2 2 0 0 1 1 0 2 0 1 2 1 0 0 2 2 0 1 2 1 6 0 2 1 0 1 1 0 0 2 0 0 0 0 0 0 0
0 0 0 1 0 0 1 0 0 1 0 1 1 1 1 3 1 0 1 0 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
7 0 0 0 0 0 0 0 0 0 0 0 1 2 0 2 1 3 0 0 0 1 2 0 0 1 1 0 0 0 1 2 0 0 0 1 0 0 2 1 1
0 1 0 0 0

ferrugineus

0 1 1 1 2 0 0 1 1 0 2 0 1 1 1 0 0 2 2 1 1 2 2 6 0 2 1 0 1 1 0 0 1 0 0 0 0 0 0 1
1 0 0 1 0 1 1 0 0 0 1 1 0 0 0 0 1 0 0 1 0 0 1 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 1 0 0 0 0 0 0 0 1 2 0 2 1 3 0 0 0 1 2 0 0 1 0 0 0 1 1 2 0 0 1 1 2 1 1 1
0 0 1 0 0

pallidus

0 1 1 2 2 0 0 1 2 0 2 0 1 2 1 0 0 2 2 1 1 0 0 8 0 1 1 0 1 1 0 0 1 0 0 0 0 0 0 0
0 0 0 1 0 0 0 0 1 0 0 1 1 0 2 0 0 1 0 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
5 0 0 0 0 0 0 0 0 0 0 0 0 1 3 2 3 0 0 0 1 2 1 0 2 0 0 0 0 1 4 0 1 0 1 0 0 1 1 1
0 2 0 0 0

signatipennis

1 0 0 2 1 0 0 1 0 0 2 0 1 2 2 0 0 1 2 0 1 2 1 4 1 2 1 0 1 1 0 1 1 0 0 0 0 0 1
0 0 0 1 0 0 0 0 0 0 0 1 1 0 0 1 0 0 1 1 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 0 1 1 0 1 0 3 0 0 0 1 2 1 1 1 0 0 0 0 1 2 0 0 0 1 0 0 0 1 1
0 0 0 0 0

TABLE 1. Variation accounted for by the components (%, calculated from eigenvalues) and eigenvector loading in 5 principle components (PCs) from a 32-variable principal component analysis of 447 male specimens of *Tricholabiodes*.

Characters	PC 1	PC 2	PC 3	PC 4	PC 5
	29.79%	9.65%	7.79%	6.42%	4.53%
0.	0.70253	0.02197	0.06480	0.30555	0.10168
1.	-0.35618	0.36900	0.29156	-0.10234	-0.41167
2.	0.51491	-0.10711	0.36924	0.55094	-0.02112
3.	0.68704	0.06068	-0.16733	0.03872	0.41980
4.	-0.62226	0.10184	0.18820	0.32982	0.05648
5.	0.47137	0.23235	0.33811	-0.14805	-0.08939
6.	0.18317	0.53985	-0.09530	0.30089	0.24575
7.	0.10050	-0.50677	0.19558	0.37685	-0.39129
8.	-0.50287	0.16039	-0.25181	-0.12387	-0.03275
9.	-0.47567	-0.12227	-0.02634	0.58307	0.15100
10.	0.71469	0.30180	0.18579	-0.36458	-0.11312
11.	0.87659	0.15979	0.07101	-0.12820	-0.05693
12.	0.30528	0.30708	-0.01265	0.13487	0.30502
13.	0.73496	-0.05788	0.00864	0.18051	0.05288
14.	-0.21728	0.22924	0.06719	-0.23210	-0.23969
15.	-0.62180	-0.10343	0.41088	-0.10260	0.10312
16.	0.04019	0.39046	-0.37876	0.02722	0.48911
17.	0.78063	0.04226	-0.30066	-0.28891	-0.06177
18.	-0.86038	0.07060	0.20516	0.26030	0.11567
19.	0.53183	-0.17620	0.09183	0.18591	-0.19835
20.	-0.91926	0.17217	-0.00665	-0.10557	0.08923
21.	-0.54308	0.17943	-0.13484	-0.02477	-0.00703
22.	-0.43316	0.34265	-0.11010	0.02281	-0.22833
23.	-0.44102	0.24190	-0.09096	-0.23576	0.09433
24.	0.32558	0.02543	-0.75611	0.09565	-0.31404
25.	-0.31917	-0.78591	0.00039	-0.01836	0.15768
26.	0.11121	-0.64441	-0.16208	-0.17576	0.22112
27.	-0.07218	-0.57238	0.27927	-0.51337	0.21829
28.	-0.55929	0.01168	-0.51689	0.22044	-0.17335
29.	0.16674	0.41225	0.65957	-0.04801	0.18292
30.	-0.74107	-0.10904	-0.13400	-0.22521	0.12839
31.	-0.65315	0.18191	0.20108	0.03770	-0.01233

TABLE 2. Weight assigned to each character after successive approximations character weighting, using the data in Appendix IV.

Character	Weight	Character	Weight	Character	Weight	Character	Weight
0	0	24	10	48	0	72	1
1	0	25	10	49	10	73	10
2	10	26	10	50	10	74	0
3	10	27	0	51	0	75	0
4	3	28	0	52	10	76	7
5	1	29	10	53	10	77	0
6	2	30	2	54	10	78	3
7	10	31	2	55	10	79	2
8	10	32	0	56	1	80	0
9	10	33	0	57	0	81	0
10	5	34	2	58	10	82	1
11	10	35	10	59	10	83	4
12	1	36	3	60	4	84	10
13	10	37	10	61	0	85	0
14	10	38	10	62	10	86	1
15	10	39	10	63	10	87	4
16	10	40	1	64	10	88	4
17	0	41	10	65	1	89	10
18	10	42	2	66	0	90	4
19	10	43	0	67	10	91	0
20	3	44	10	68	0	92	0
21	2	45	10	69	10		
22	10	46	2	70	0		
23	10	47	0	71	0		

Fig. 1. - Section of a squared Euclidean distance phenogram from a UPGMA (unweighted pair group method using arithmetic averages) 32-variable (ratios) cluster analysis of 52 OTUs, with several replicates within some (n = 447; refer to text for full explanation). Based on data (Appendix VII) from ratios (Appendix V). The cophenetic correlation coefficient = 0.801. Superscript codes correspond with OTU codes in Appendix VII and specimens in the appropriate species descriptions (Chapter 9. Species of *Tricholabiodes*). A = *T. acer*, *T. concavus*, *T. disgregus*, *T. inornatus*, *T. imbellis*, *T. lividus*, *T. nodosus*, *T. pallidior*, *T. petiolatus*, *T. testaceus* and *T. petiolatus*; B = *T. alveolus*, *T. andrei*, *T. arabicus* (except *T. arabicus*[1]), *T. asiaticus*, *T. bactrianus*, *T. beludzhistanus*, *T. brothersi*, *T. carinifer*, *T. chloroticus*, *T. convexus*, *T. femoralis*, *T. ferrugineus*, *T. garamantis*, *T. indistinctus*, *T. longicarinatus*, *T. luridus*, *T. mandibularis*, *T. marmaricus*, *T. niloticus* (except *T. niloticus* (paratype)[2]), *T. nonveilleri*, *T. nursei*, *T. palaestinensis*, *T. pallidicornis*, *T. pallidus*, *T. parallelus*, *T. paulocellatus*, *T. pedunculatus*, *T. protuberans*, *T recurvatus*, *T. saharicus*, *T. scorteccii*, *T. signatipennis*, *T. sinuatus*, *T. stigmaticus*, *T. sudanensis*, *T. tharensis*, *T. thisbe*, *T. thisboides*, *T. trochantalis*.

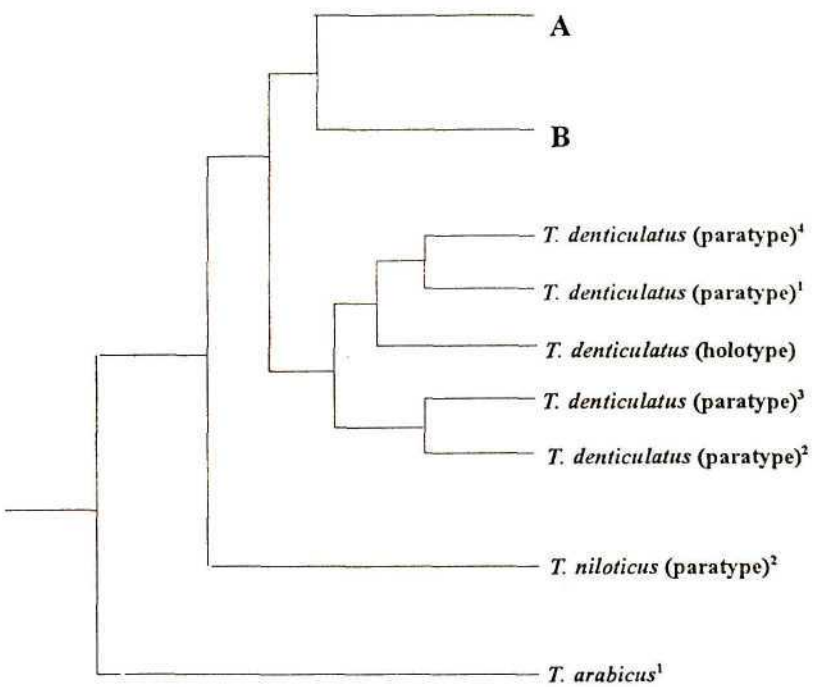

A
B
T. denticulatus (paratype)[4]
T. denticulatus (paratype)[1]
T. denticulatus (holotype)
T. denticulatus (paratype)[3]
T. denticulatus (paratype)[2]
T. niloticus (paratype)[2]
T. arabicus[1]

Fig. 2. - Scattergram of first two components from a 32-variable principal component analysis of 52 OTUs with replicates within them (n = 447), based on data (Appendix VII) from ratios (Appendix V). See text for full explanation of method. The superscript codes correspond with OTU codes in Appendix VII and specimens in the appropriate species description (Chapter 9. Species of *Tricholabiodes*). A = *T. acer*, *T. concavus*, *T. disgregus*, *T. inornatus*, *T. imbellis*, *T. lividus*, *T. nodosus*, *T. pallidior*, *T. petiolatus*, *T. testaceus* and *T. petiolatus*; B = *T. alveolus*, *T. andrei*, *T. arabicus* (except *T. arabicus*[1]), *T. asiaticus*, *T. bactrianus*, *T. beludzhistanus*, *T. brothersi*, *T. carinifer*, *T. chloroticus*, *T. convexus*, *T. femoralis*, *T. ferrugineus*, *T. garamantis*, *T. indistinctus*, *T. longicarinatus*, *T. luridus*, *T. mandibularis*, *T. marmaricus*, *T. niloticus* (except *T. niloticus* (paratype)[2]), *T. nonveilleri*, *T. nursei*, *T. palaestinensis*, *T. pallidicornis*, *T. pallidus*, *T. parallelus*, *T. paulocellatus*, *T. pedunculatus*, *T. protuberans*, *T recurvatus*, *T. saharicus*, *T. scorteccii*, *T. signatipennis*, *T. sinuatus*, *T. stigmaticus*, *T. sudanensis*, *T. tharensis*, *T. thisbe*, *T. thisboides*, *T. trochantalis*; C = *T. denticulatus*; D = *T. niloticus* (paratype)[2]; E = *T. arabicus*[1].

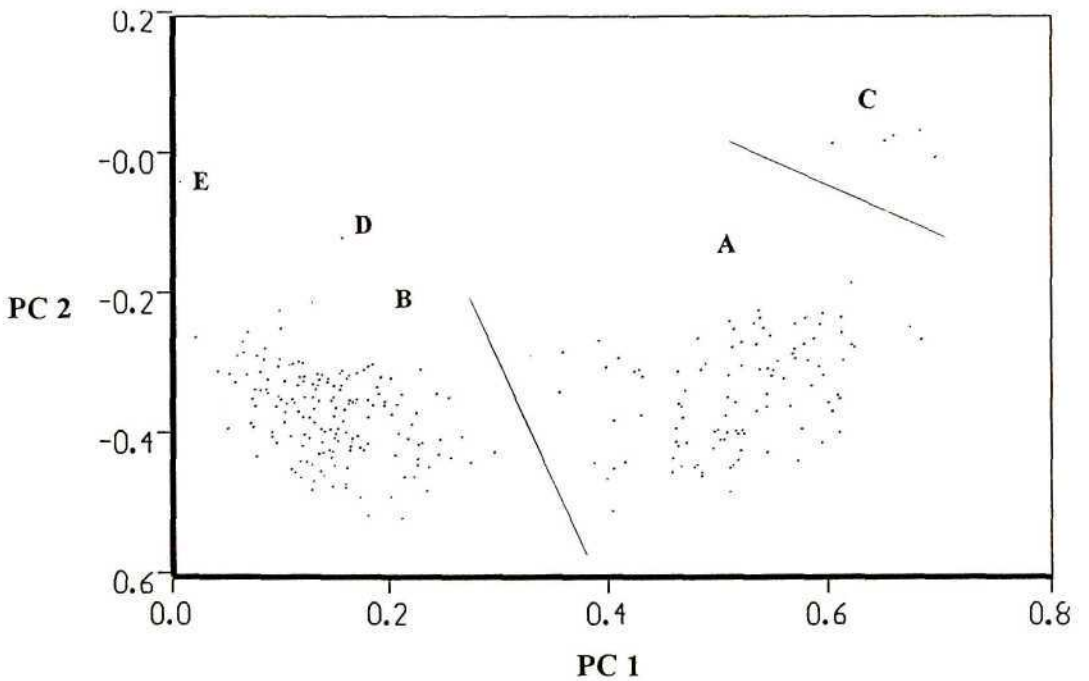

0.2
-0.0
-0.2
-0.4
0.6
PC 2
0.0
0.2
0.4
0.6
0.8
PC 1
A
B
C
D
E

Fig. 3. - The upper phena of a similarity phenogram (simple matching coefficient) from a UPGMA (unweighted pair group method using arithmetic averages) 124-variable cluster analysis of 52 OTUs with several replicates within some OTUs (n = 447). Based on data (Appendix VIII) from coded characters (Appendix VI). See text for full explanation of method. The superscript codes correspond with OTU codes in Appendix VIII and specimens in the appropriate species descriptions (Chapter 9. Species of *Tricholabiodes*).

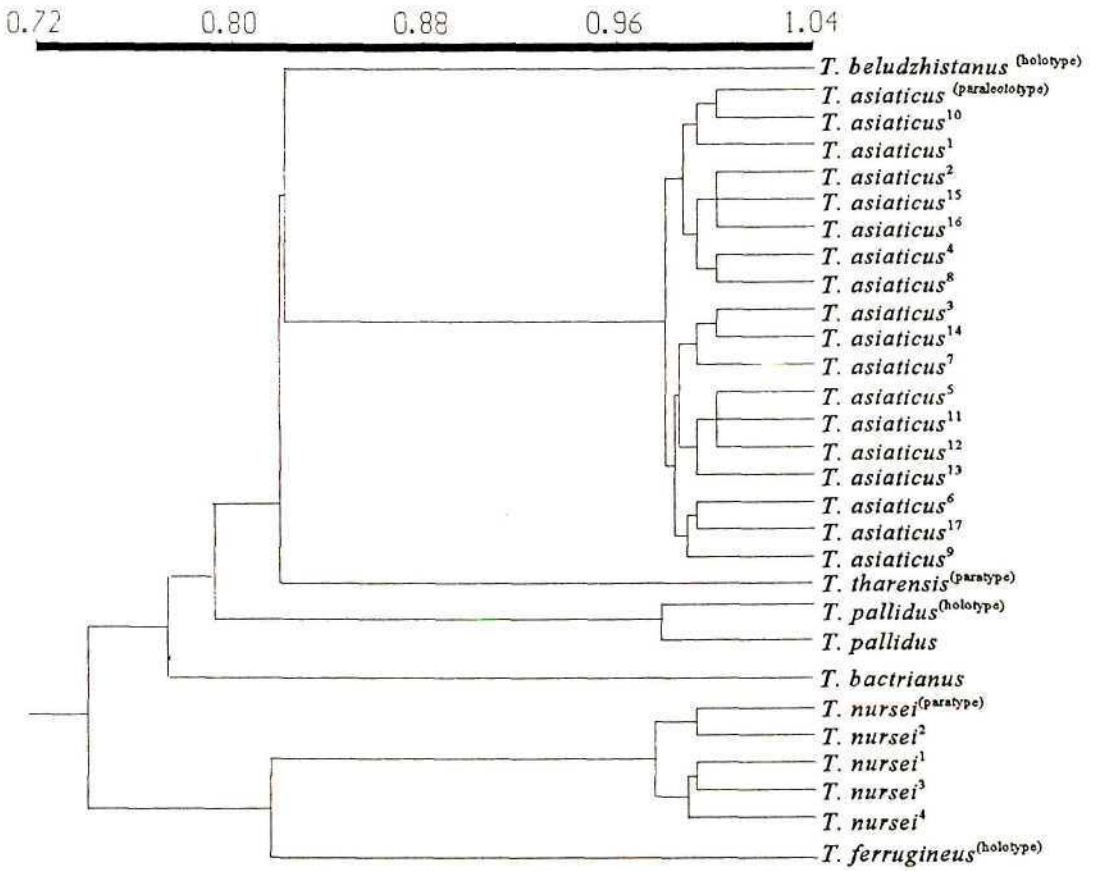

0.72
0.80
0.88
0.96
1.04
T. beludzhistanus (holotype)
T. asiaticus (paralectotype)
T. asiaticus10
T. asiaticus1
T. asiaticus2
T. asiaticus15
T. asiaticus16
T. asiaticus4
T. asiaticus8
T. asiaticus3
T. asiaticus14
T. asiaticus7
T. asiaticus5
T. asiaticus11
T. asiaticus12
T. asiaticus13
T. asiaticus6
T. asiaticus17
T. asiaticus9
T. tharensis(paratype)
T. pallidus(holotype)
T. pallidus
T. bactrianus
T. nursei(paratype)
T. nursei2
T. nursei1
T. nursei3
T. nursei4
T. ferrugineus(holotype)

Fig. 4. - Similarity phenogram of 52 OTUs of *Tricholabiodes* using 124 variables, based on data (Appendix IX) from coded characters (Appendix VI). See text for explanation of method.

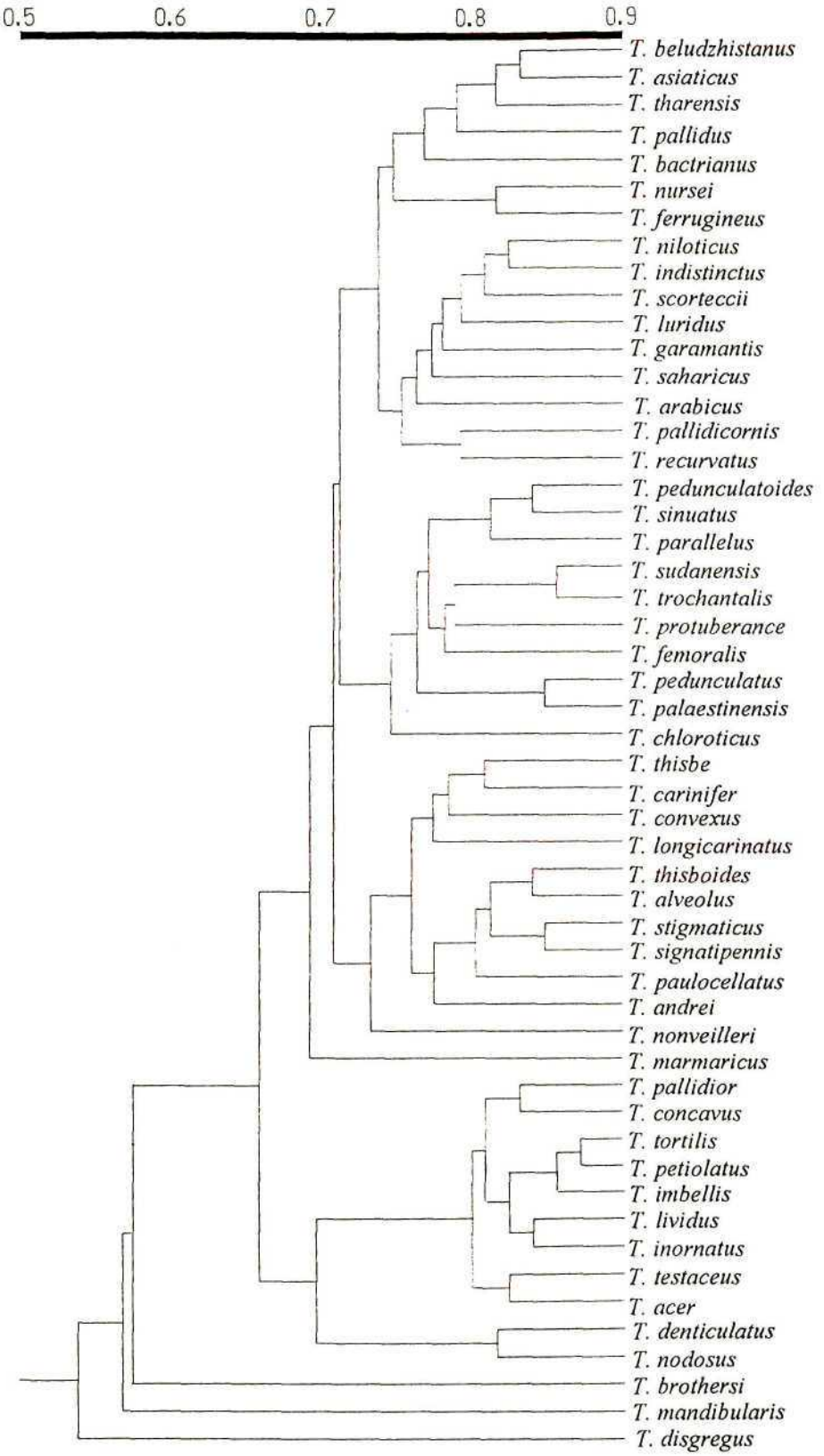

0.5
0.6
0.7
0.8
0.9
T. beludzhistanus
T. asiaticus
T. tharensis
T. pallidus
T. bactrianus
T. nursei
T. ferrugineus
T. niloticus
T. indistinctus
T. scorteccii
T. luridus
T. garamantis
T. saharicus
T. arabicus
T. pallidicornis
T. recurvatus
T. pedunculatoides
T. sinuatus
T. parallelus
T. sudanensis
T. trochantalis
T. protuberance
T. femoralis
T. pedunculatus
T. palaestinensis
T. chloroticus
T. thisbe
T. carinifer
T. convexus
T. longicarinatus
T. thisboides
T. alveolus
T. stigmaticus
T. signatipennis
T. paulocellatus
T. andrei
T. nonveilleri
T. marmaricus
T. pallidior
T. concavus
T. tortilis
T. petiolatus
T. imbellis
T. lividus
T. inornatus
T. testaceus
T. acer
T. denticulatus
T. nodosus
T. brothersi
T. mandibularis
T. disgregus

Fig. 5. - Similarity phenogram of 52 OTUs of *Tricholabiodes* using 124 variables, based on data (Appendix IX) from coded characters (Appendix VI). See text for explanation of method. Because of limited space on the phenogram, only the regional distributions of each OTU are provided.

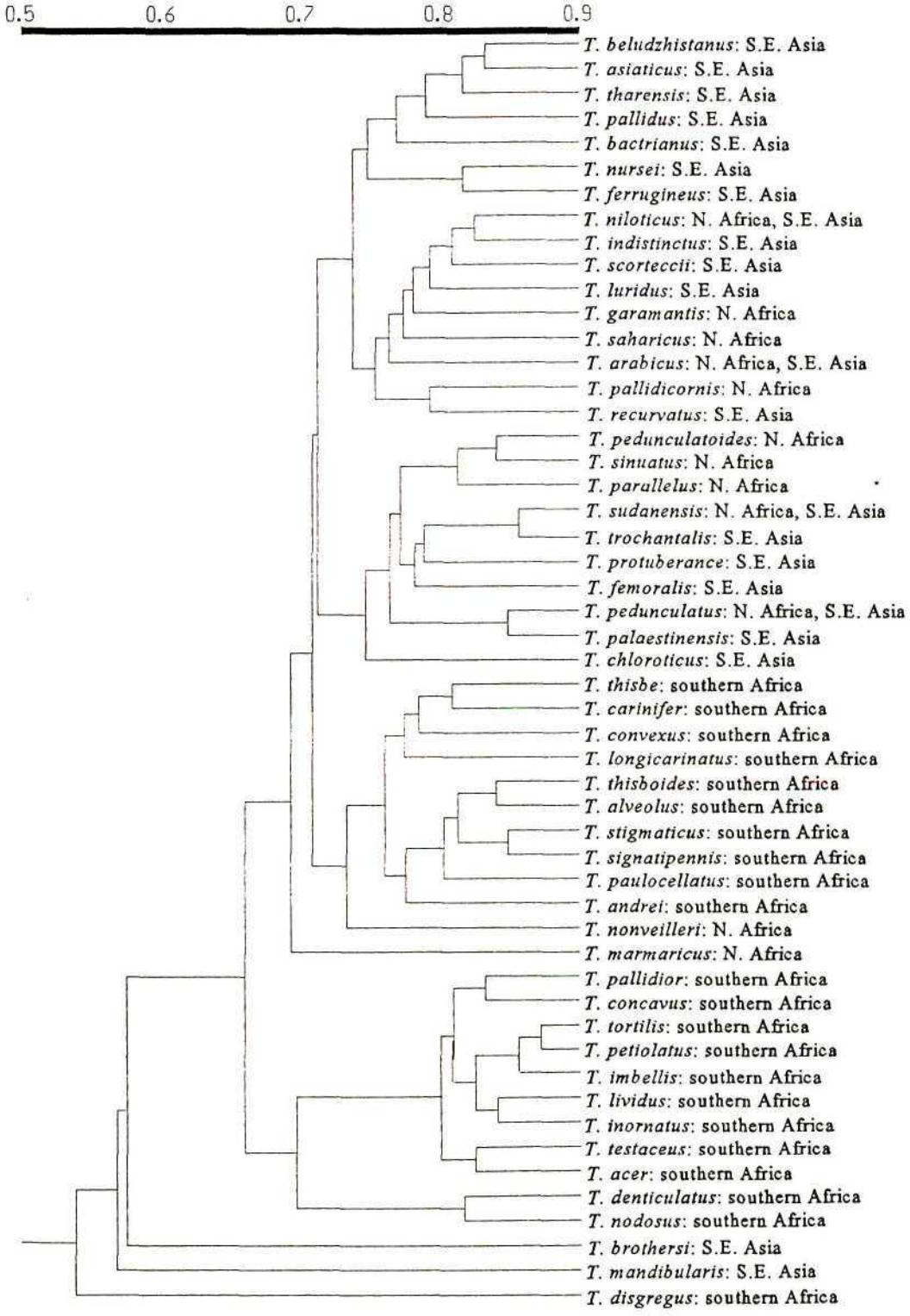

0.5
0.6
0.7
0.8
0.9
T. beludzhistanus: S.E. Asia
T. asiaticus: S.E. Asia
T. tharensis: S.E. Asia
T. pallidus: S.E. Asia
T. bactrianus: S.E. Asia
T. nursei: S.E. Asia
T. ferrugineus: S.E. Asia
T. niloticus: N. Africa, S.E. Asia
T. indistinctus: S.E. Asia
T. scorteccii: S.E. Asia
T. luridus: S.E. Asia
T. garamantis: N. Africa
T. saharicus: N. Africa
T. arabicus: N. Africa, S.E. Asia
T. pallidicornis: N. Africa
T. recurvatus: S.E. Asia
T. pedunculatoides: N. Africa
T. sinuatus: N. Africa
T. parallelus: N. Africa
T. sudanensis: N. Africa, S.E. Asia
T. trochantalis: S.E. Asia
T. protuberance: S.E. Asia
T. femoralis: S.E. Asia
T. pedunculatus: N. Africa, S.E. Asia
T. palaestinensis: S.E. Asia
T. chloroticus: S.E. Asia
T. thisbe: southern Africa
T. carinifer: southern Africa
T. convexus: southern Africa
T. longicarinatus: southern Africa
T. thisboides: southern Africa
T. alveolus: southern Africa
T. stigmaticus: southern Africa
T. signatipennis: southern Africa
T. paulocellatus: southern Africa
T. andrei: southern Africa
T. nonveilleri: N. Africa
T. marmaricus: N. Africa
T. pallidior: southern Africa
T. concavus: southern Africa
T. tortilis: southern Africa
T. petiolatus: southern Africa
T. imbellis: southern Africa
T. lividus: southern Africa
T. inornatus: southern Africa
T. testaceus: southern Africa
T. acer: southern Africa
T. denticulatus: southern Africa
T. nodosus: southern Africa
T. brothersi: S.E. Asia
T. mandibularis: S.E. Asia
T. disgregus: southern Africa

Fig. 6. - Strict consensus tree of 258 equally most parsimonious cladograms from analysis of data in Appendix IV, without character weighting (raw length 371, ci 0.31, ri 0.58).

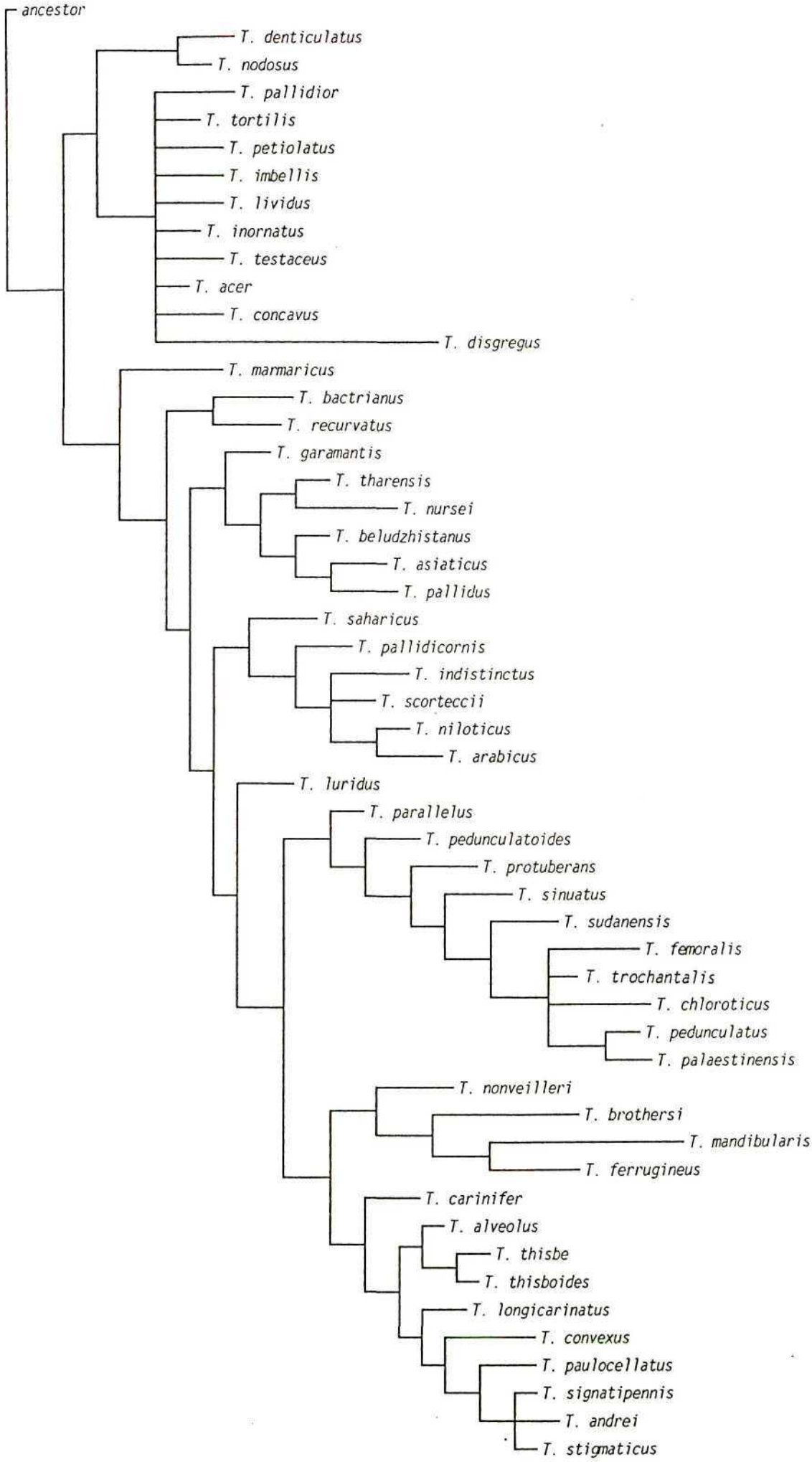

ancestor
T. denticulatus
T. nodosus
T. pallidior
T. tortilis
T. petiolatus
T. imbellis
T. lividus
T. inornatus
T. testaceus
T. acer
T. concavus
T. disgregus
T. marmaricus
T. bactrianus
T. recurvatus
T. garamantis
T. tharensis
T. nursei
T. beludzhistanus
T. asiaticus
T. pallidus
T. saharicus
T. pallidicornis
T. indistinctus
T. scorteccii
T. niloticus
T. arabicus
T. luridus
T. parallelus
T. pedunculatoides
T. protuberans
T. sinuatus
T. sudanensis
T. femoralis
T. trochantalis
T. chloroticus
T. pedunculatus
T. palaestinensis
T. nonveilleri
T. brothersi
T. mandibularis
T. ferrugineus
T. carinifer
T. alveolus
T. thisbe
T. thisboides
T. longicarinatus
T. convexus
T. paulocellatus
T. signatipennis
T. andrei
T. stigmaticus

Fig. 7. - Strict consensus tree of 1776 equally most parsimonious cladograms from analysis of data in Appendix IV, after successive approximations character weighting (raw length 396, ci 0.29, ri 0.54).

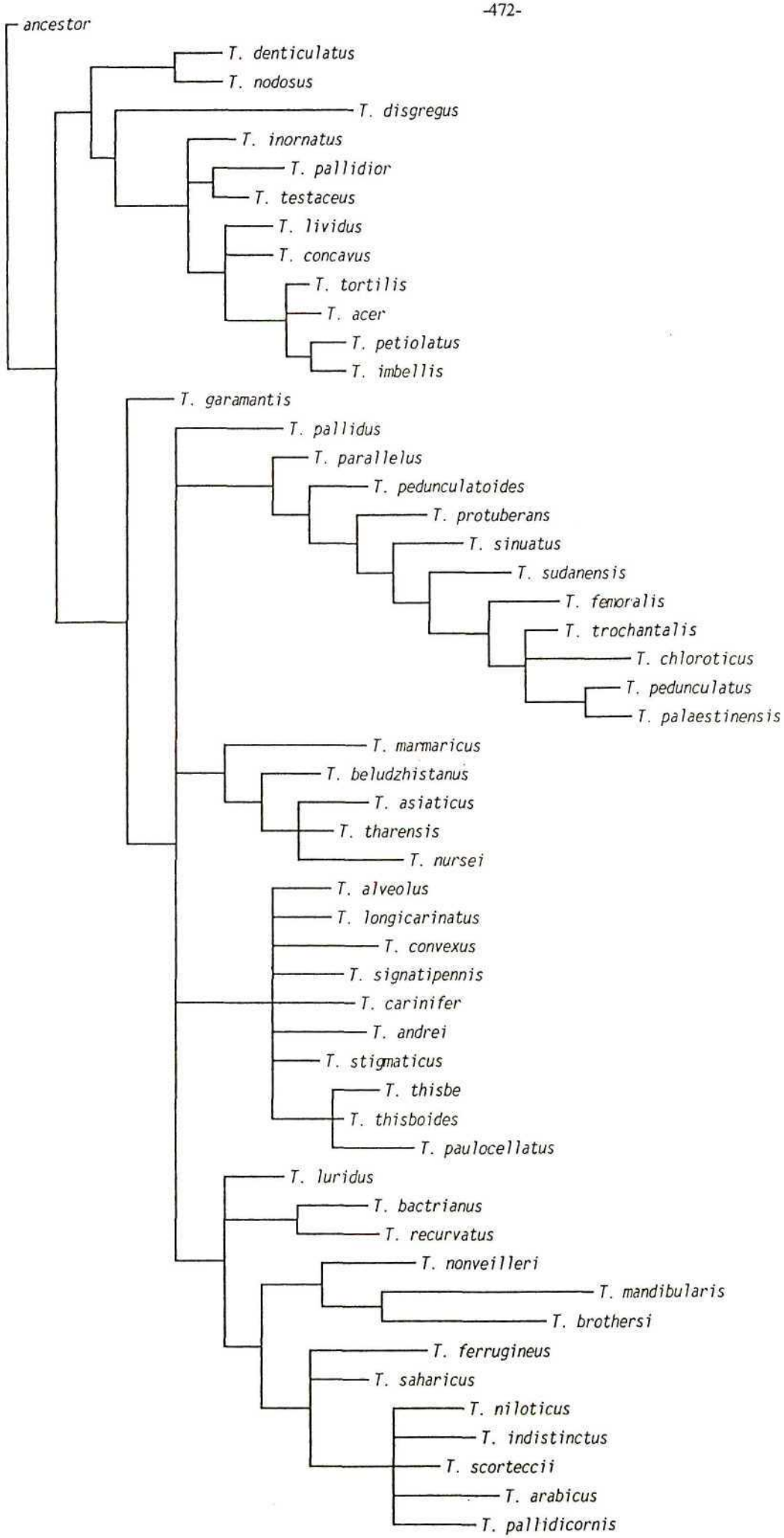

ancestor
T. denticulatus
T. nodosus
T. disgregus
T. inornatus
T. pallidior
T. testaceus
T. lividus
T. concavus
T. tortilis
T. acer
T. petiolatus
T. imbellis
T. garamantis
T. pallidus
T. parallelus
T. pedunculatoides
T. protuberans
T. sinuatus
T. sudanensis
T. femoralis
T. trochantalis
T. chloroticus
T. pedunculatus
T. palaestinensis
T. marmaricus
T. beludzhistanus
T. asiaticus
T. tharensis
T. nursei
T. alveolus
T. longicarinatus
T. convexus
T. signatipennis
T. carinifer
T. andrei
T. stigmaticus
T. thisbe
T. thisboides
T. paulocellatus
T. luridus
T. bactrianus
T. recurvatus
T. nonveilleri
T. mandibularis
T. brothersi
T. ferrugineus
T. saharicus
T. niloticus
T. indistinctus
T. scorteccii
T. arabicus
T. pallidicornis

Fig. 8. - Cladogram representing the most likely phylogeny of *Tricholabiodes*. It is one of 258 equally most parsimonious cladograms from the analysis of data in Appendix IV, without character weighting (length 352, ci 0.33, ri 0.61). Character transformation symbolised as follows: black = unique derivation; grey = convergent derivation; open = reversal (unique or convergent).

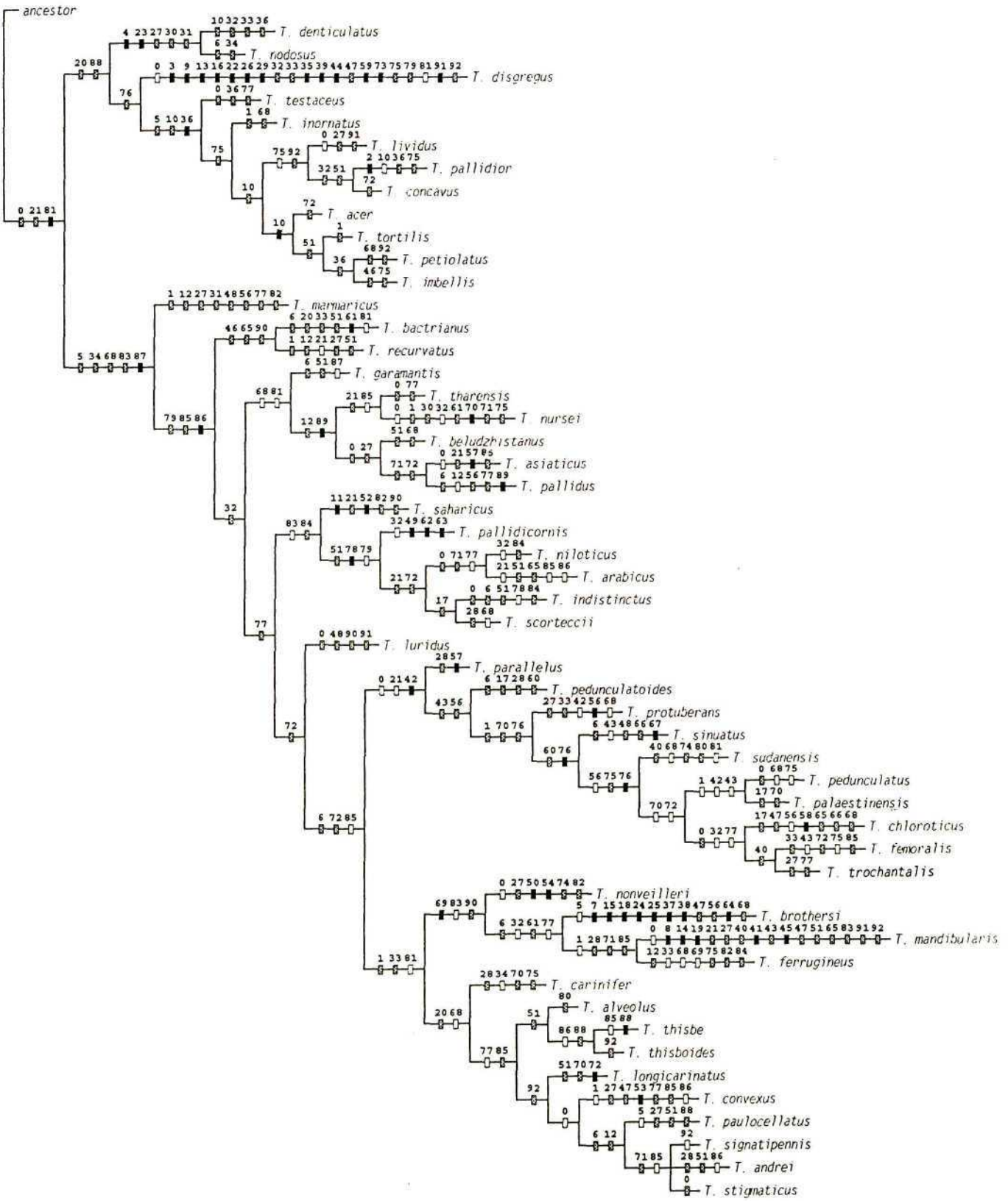

ancestor
T. denticulatus
T. rodosus
T. disgregus
T. testaceus
T. inornatus
T. lividus
T. pallidior
T. concavus
T. acer
T. tortilis
T. petiolatus
T. imbellis
T. marmaricus
T. bactrianus
T. recurvatus
T. garamantis
T. tharensis
T. nursei
T. beludzhistanus
T. asiaticus
T. pallidus
T. saharicus
T. pallidicornis
T. niloticus
T. arabicus
T. indistinctus
T. scorteccii
T. luridus
T. parallelus
T. pedunculatoides
T. protuberans
T. sinuatus
T. sudanensis
T. pedunculatus
T. palaestinensis
T. chloroticus
T. femoralis
T. trochantalis
T. nonveilleri
T. brothersi
T. mandibularis
T. ferrugineus
T. carinifer
T. alveolus
T. thisbe
T. thisboides
T. longicarinatus
T. convexus
T. paulocellatus
T. signatipennis
T. andrei
T. stigmaticus

Fig. 9. - Cladogram representing the most likely phylogeny of *Tricholabiodes*. It is one of 258 equally most parsimonious cladograms from the analysis of data in Appendix IV, without character weighting (length 352, ci 0.33, ri 0.61). The biogeographical information for each species is given.

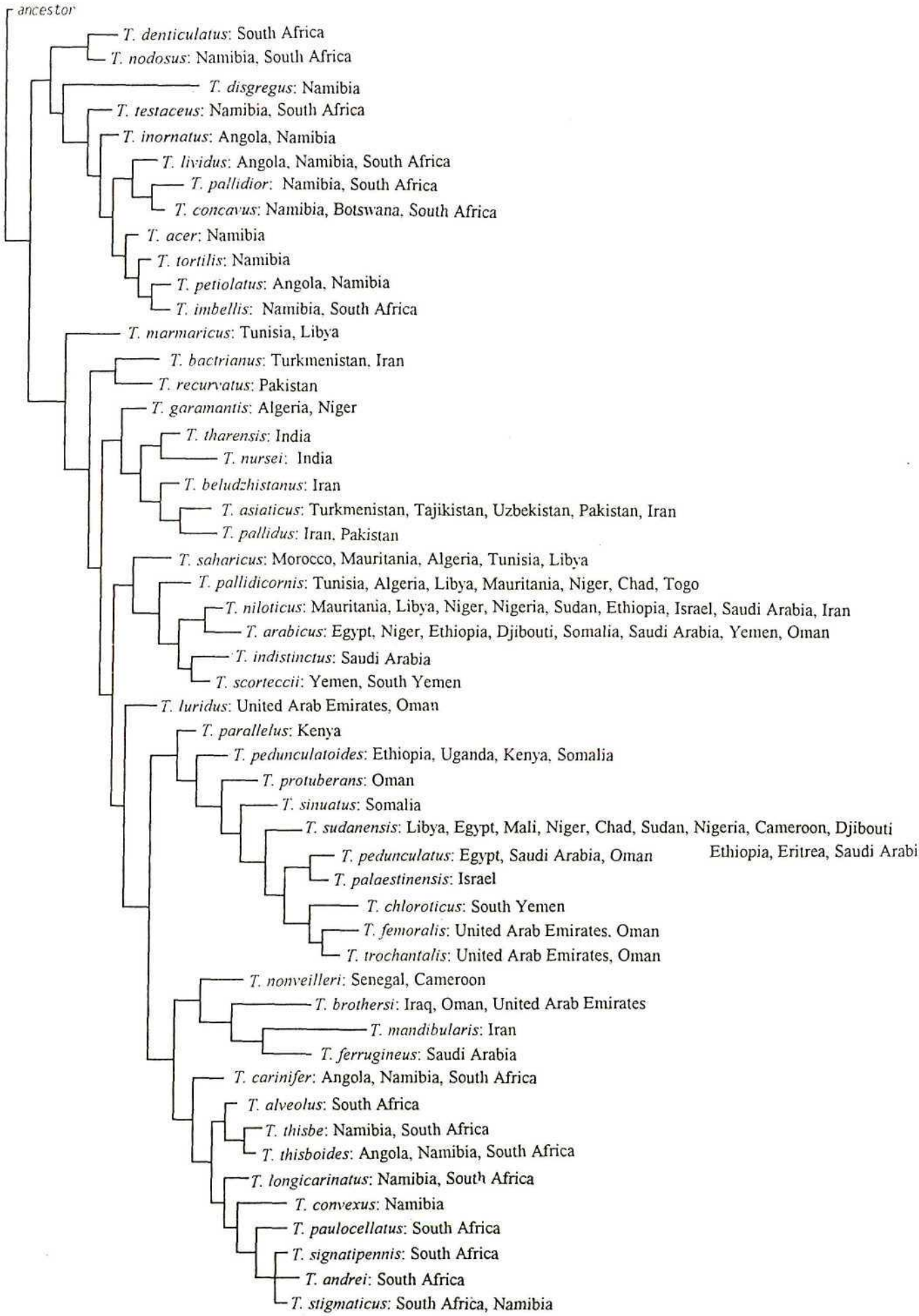
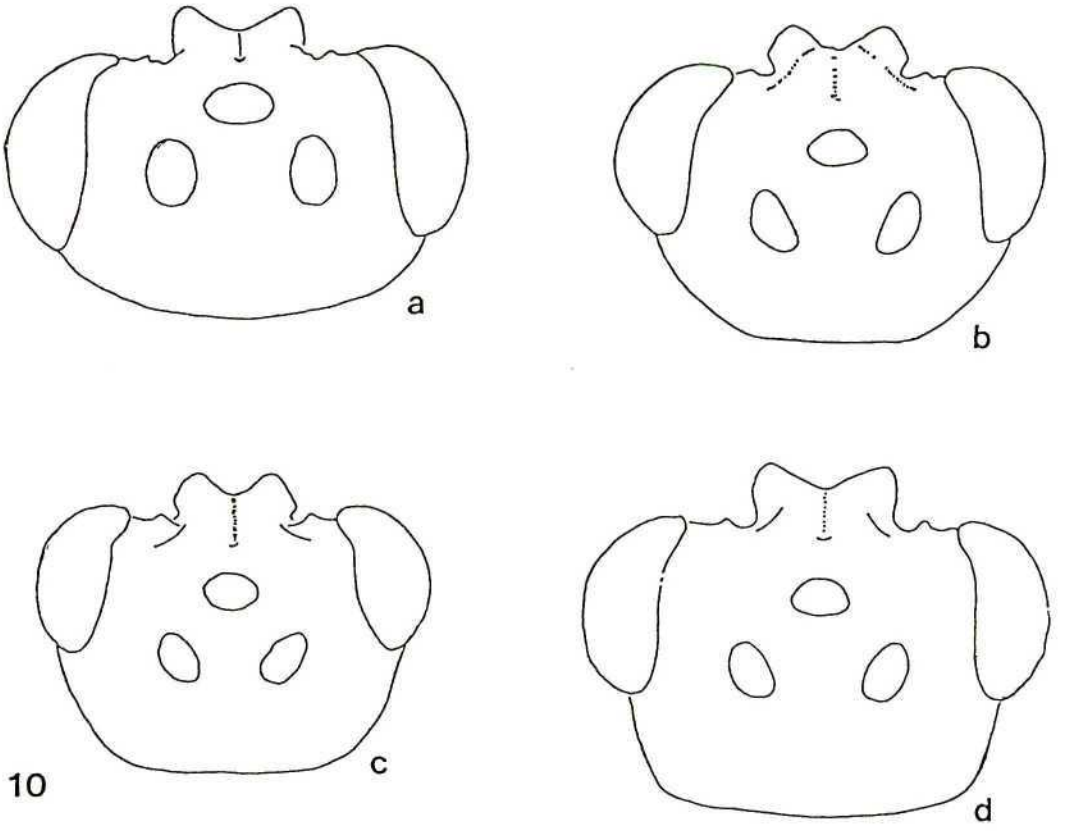

ancestor
T. denticulatus: South Africa
T. nodosus: Namibia, South Africa
T. disgregus: Namibia
T. testaceus: Namibia, South Africa
T. inornatus: Angola, Namibia
T. lividus: Angola, Namibia, South Africa
T. pallidior: Namibia, South Africa
T. concavus: Namibia, Botswana, South Africa
T. acer: Namibia
T. tortilis: Namibia
T. petiolatus: Angola, Namibia
T. imbellis: Namibia, South Africa
T. marmaricus: Tunisia, Libya
T. bactrianus: Turkmenistan, Iran
T. recurvatus: Pakistan
T. garamantis: Algeria, Niger
T. tharensis: India
T. nursei: India
T. beludzhistanus: Iran
T. asiaticus: Turkmenistan, Tajikistan, Uzbekistan, Pakistan, Iran
T. pallidus: Iran, Pakistan
T. saharicus: Morocco, Mauritania, Algeria, Tunisia, Libya
T. pallidicornis: Tunisia, Algeria, Libya, Mauritania, Niger, Chad, Togo
T. niloticus: Mauritania, Libya, Niger, Nigeria, Sudan, Ethiopia, Israel, Saudi Arabia, Iran
T. arabicus: Egypt, Niger, Ethiopia, Djibouti, Somalia, Saudi Arabia, Yemen, Oman
T. indistinctus: Saudi Arabia
T. scorteccii: Yemen, South Yemen
T. luridus: United Arab Emirates, Oman
T. parallelus: Kenya
T. pedunculatoides: Ethiopia, Uganda, Kenya, Somalia
T. protuberans: Oman
T. sinuatus: Somalia
T. sudanensis: Libya, Egypt, Mali, Niger, Chad, Sudan, Nigeria, Cameroon, Djibouti
T. pedunculatus: Egypt, Saudi Arabia, Oman
Ethiopia, Eritrea, Saudi Arabia
T. palaestinensis: Israel
T. chloroticus: South Yemen
T. femoralis: United Arab Emirates, Oman
T. trochantalis: United Arab Emirates, Oman
T. nonveilleri: Senegal, Cameroon
T. brothersi: Iraq, Oman, United Arab Emirates
T. mandibularis: Iran
T. ferrugineus: Saudi Arabia
T. carinifer: Angola, Namibia, South Africa
T. alveolus: South Africa
T. thisbe: Namibia, South Africa
T. thisboides: Angola, Namibia, South Africa
T. longicarinatus: Namibia, South Africa
T. convexus: Namibia
T. paulocellatus: South Africa
T. signatipennis: South Africa
T. andrei: South Africa
T. stigmaticus: South Africa, Namibia

Fig. 10.- *Tricholabiodes* spp, ♂, head, dorsal view. Sides behind compound eyes: a) strongly convergent posteriorly and merging with weakly convex posterior margin; b) slightly convergent posteriorly and gradually merging with weakly convex posterior margin; c, d) subparallel, distinct from weakly convex posterior margin.

Fig. 11. - *Tricholabiodes* spp, ♂, mandible, anterior view. Middle and inner teeth: a) separated by distance half width of apical tooth; b) adjacent, inner tooth subrounded; c) separated by distance subequal to width of apical tooth, inner tooth acute; d) separate, inner tooth truncate.



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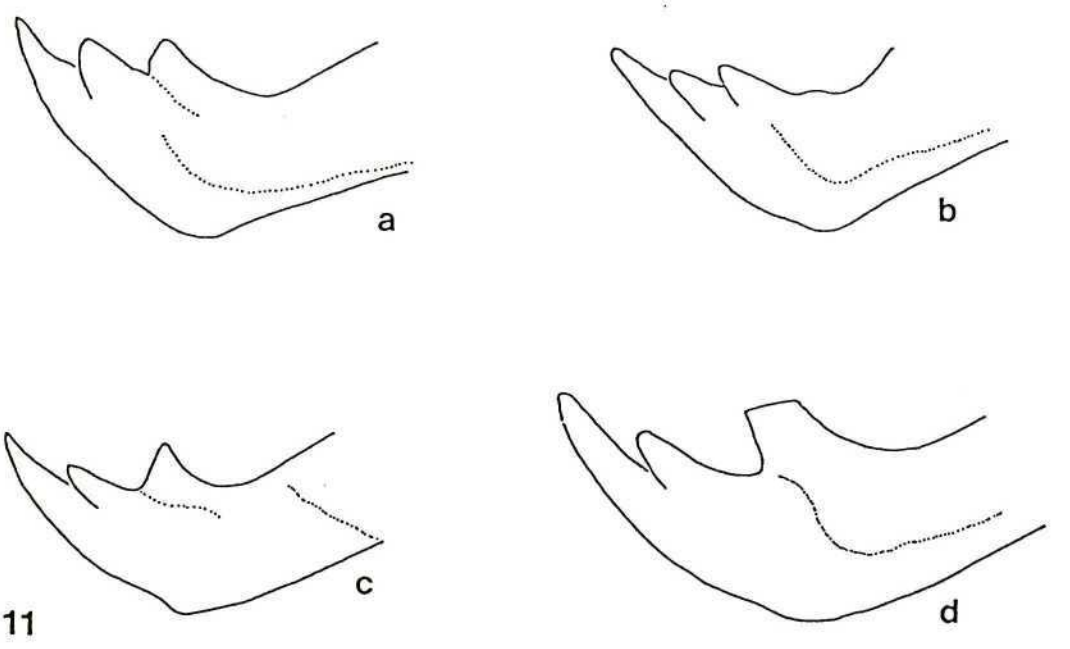

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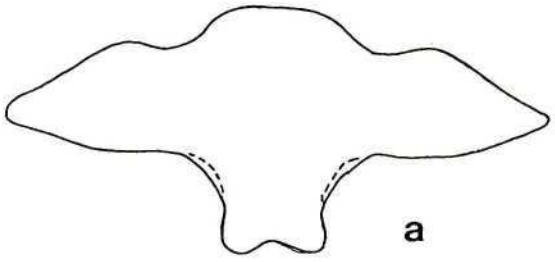
Fig. 12. - *Tricholabiodes* spp, ♂, clypeus, anterior view with free border directed towards the bottom of the page. a) Free border strongly protruding, broadly transverse and truncated; b) mesal area strongly protruding and subsquare; c) mesal area strongly protruding in an arch; d) mesal area slightly protruding in an arch; e) convex; f) mesal area protruding in a strong protruding arch, arch mesally notched forming a triangulate protuberance on each side of midline; g) convex with a slight protuberance on each side of midline; h) convex with a rounded tubercle on each side of midline.



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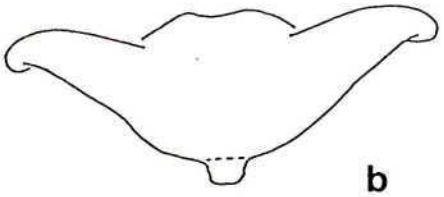

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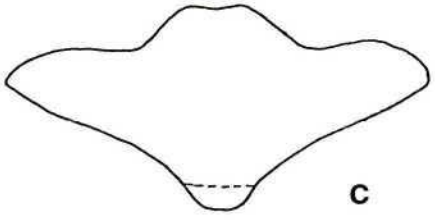

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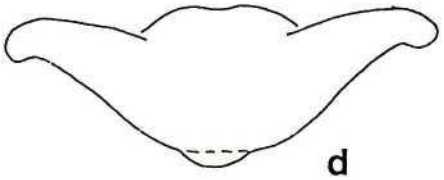

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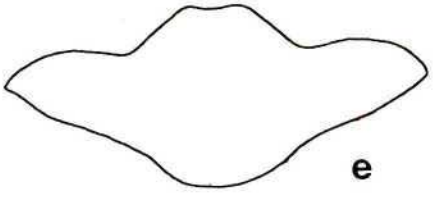

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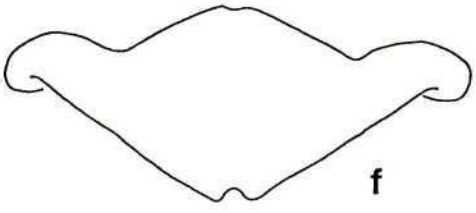

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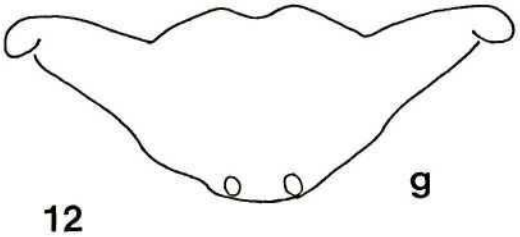

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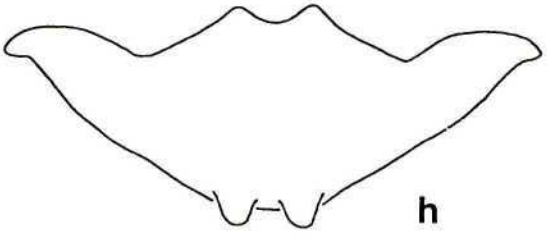

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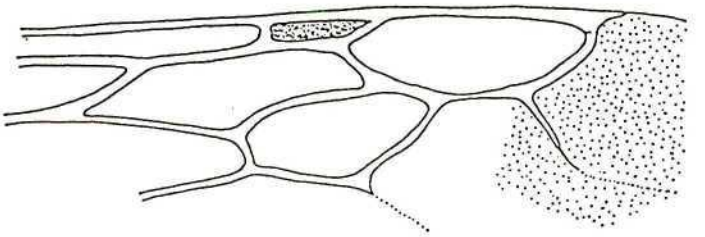
Fig. 13. - *Tricholabiodes* spp, ♂, anterior portion of right fore wing, dorsal view. Second submarginal cell: a) anteriorly sessile; b) anteriorly acute and barely reaching marginal cell; c) anteriorly petiolate.

Fig. 14. - *Tricholabiodes* spp, ♂, metatrochanter, lateral view. a) Simple; b) slightly swollen ventrally.

Fig. 15. - *Tricholabiodes* spp, ♂, mesofemur, lateral view. Greatest width: a) at midlength; b) in basal third, dorsal and ventral margin subparallel.



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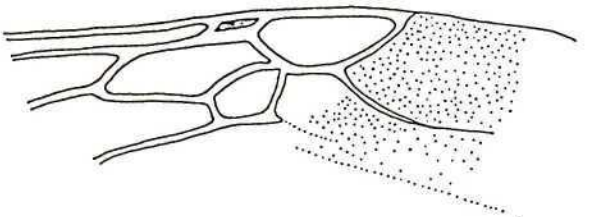

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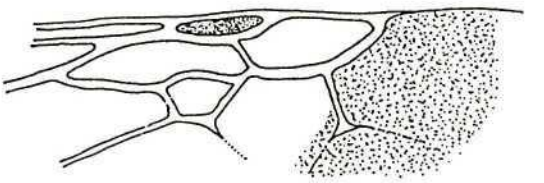

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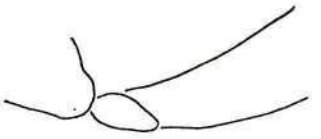

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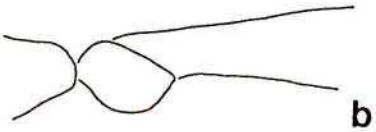

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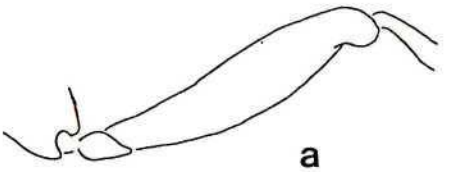

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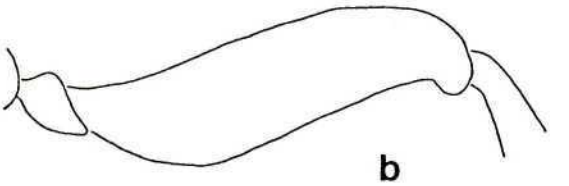

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Fig. 16. - *Tricholabiodes* spp, ♂, metacoxae, ventral view. Mesal margin: a) unarmed; b) with a triangular protuberance < 0.40 X the length of the coxa, protuberance continuous with the contour of the ventral surface of coxa; c) with a triangular protuberance > 0.5 X length of the coxa, protuberance continuous with the contour of the ventral surface of the coxa; d) with a large protruding flange at midlength; e) with a large dentiform flange posteriorly; f) with a longitudinal carina < 0.5 X length of the coxa; g) with a longitudinal carina < 0.5 X length of the coxa, carina posteriorly slightly angulated; h) with a longitudinal carina > 0.6 X length of the coxa; i) with an enlarged, slightly rounded lobule, apex of lobule weakly sclerotised.

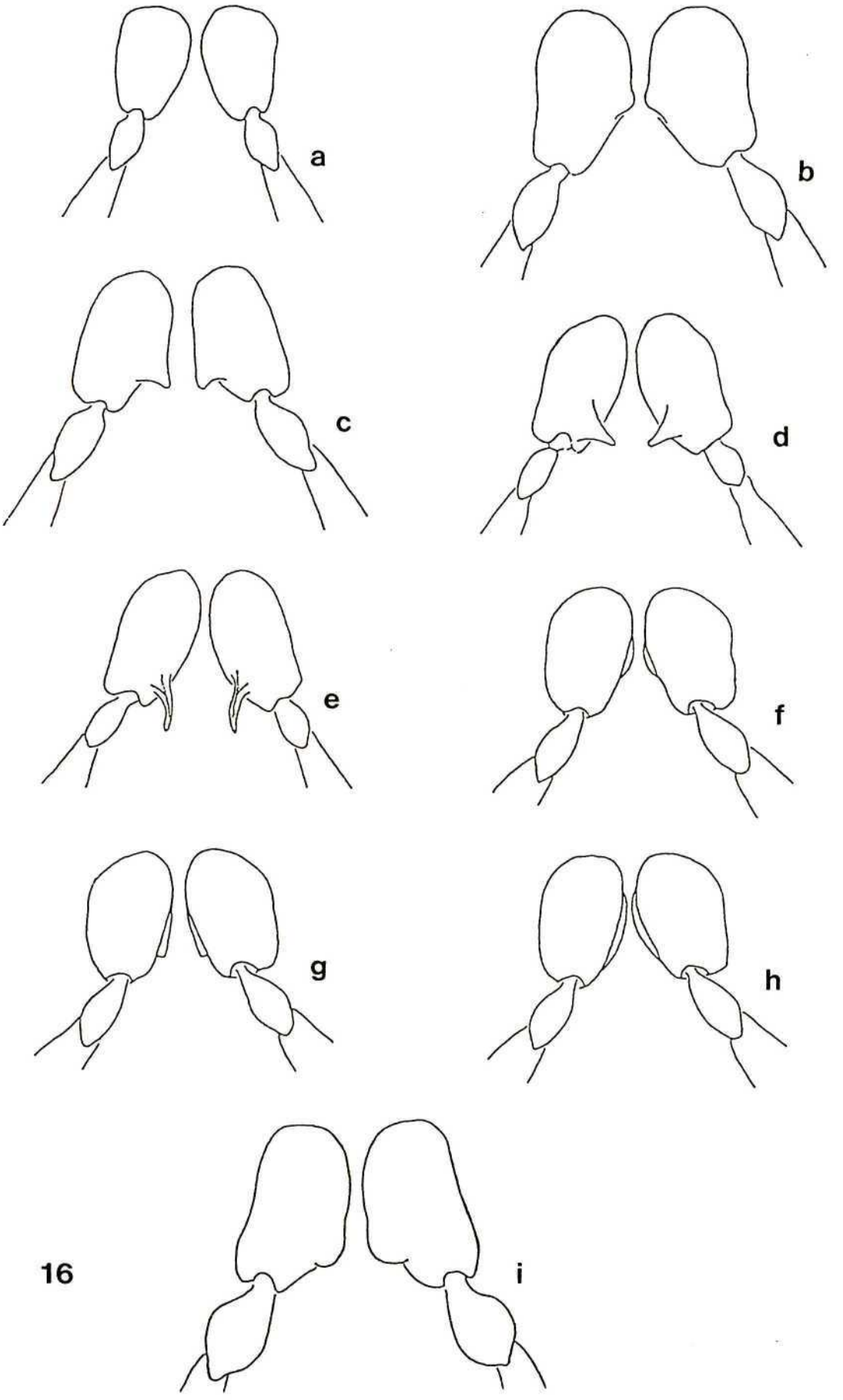

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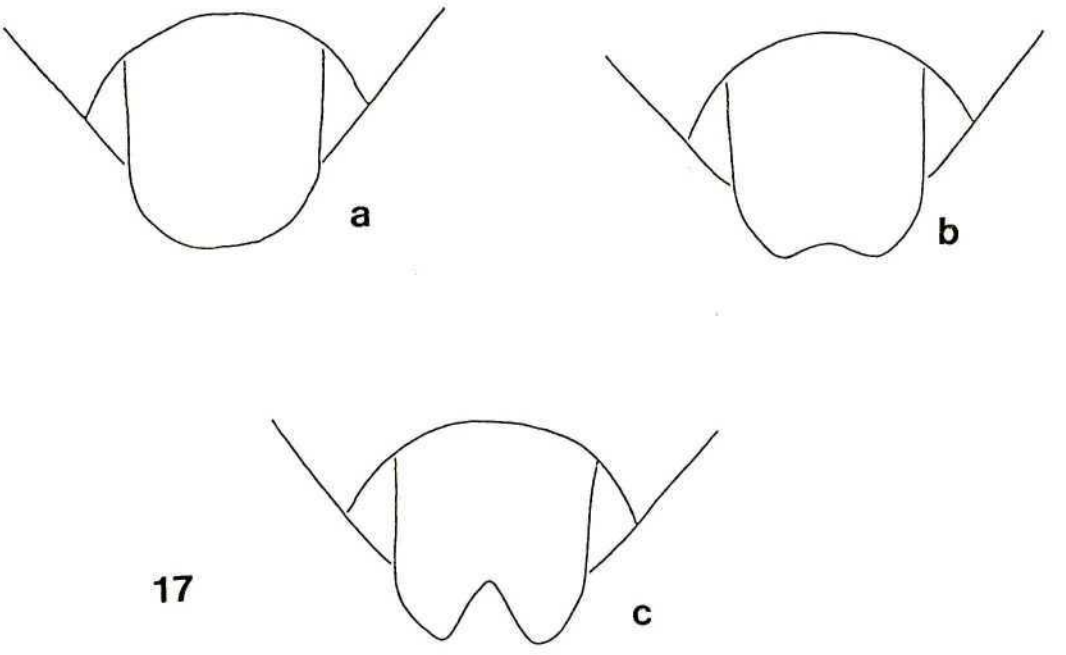
Fig. 17. - *Tricholabiodes* spp, ♂, hypopygium, ventral view. Posterior margin: a) entire; b) shallowly concave; c) deeply notched.

Fig. 18. - *Tricholabiodes* sp, ♂, genitalia, generalised. l.v.: sagittal view of left half and right penis valve. d.v.: dorsal view of left half. v.v.: ventral view of left half. BR = basal ring, L = dorsal lobe of penis valve, P = paramere, PL = parapenial lobe of gonabase, PV = penis valve, V = volsella.



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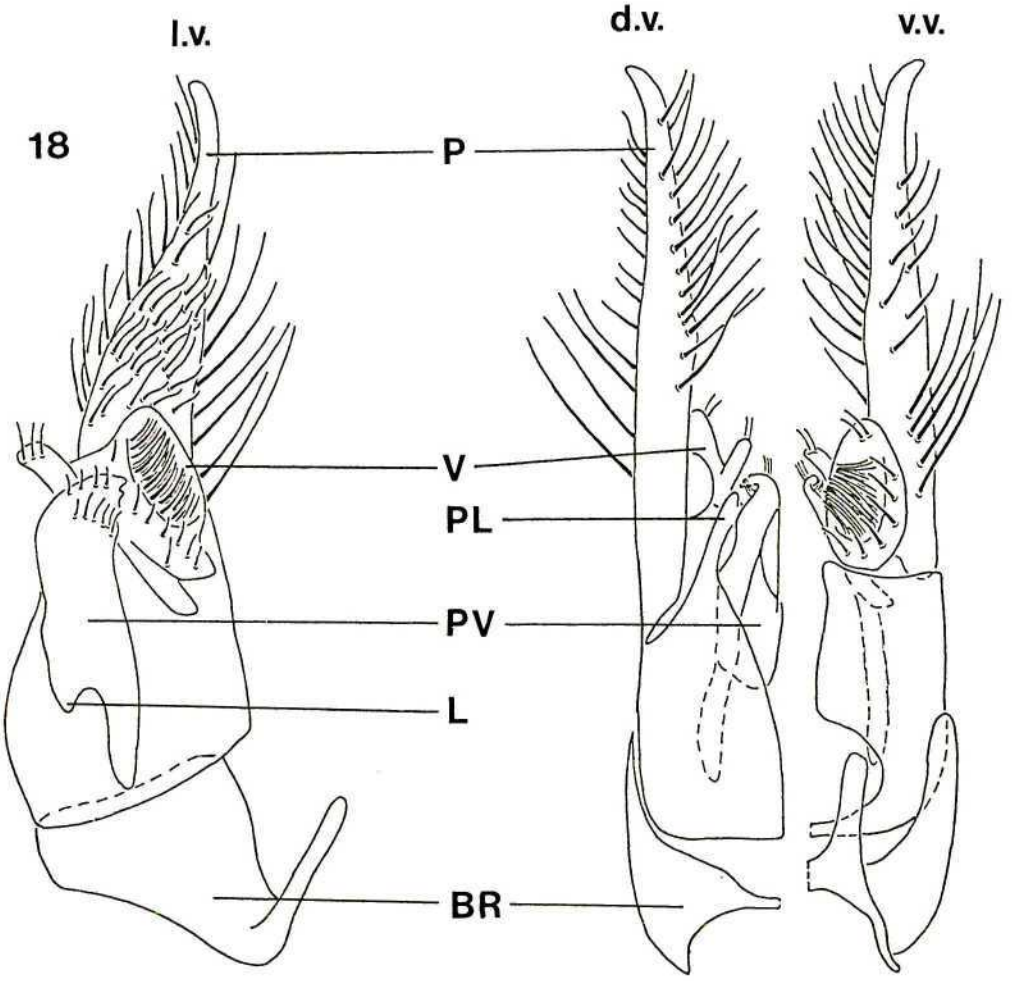

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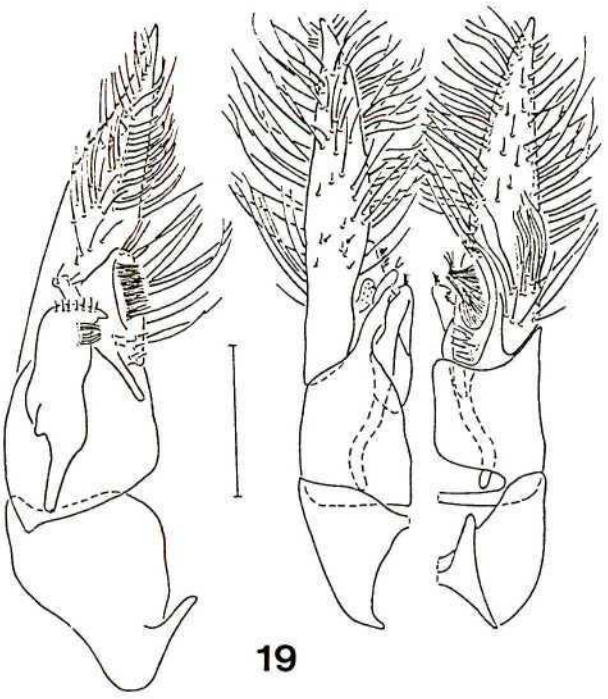
Figs 19-22. - *Tricholabiodes* spp, ♂, genitalia: 19) *T. convexus*; 20) *T. chloroticus*; 21) *T. femoralis*; 22) *T. sudanensis*. (Scale = 0.5 mm).



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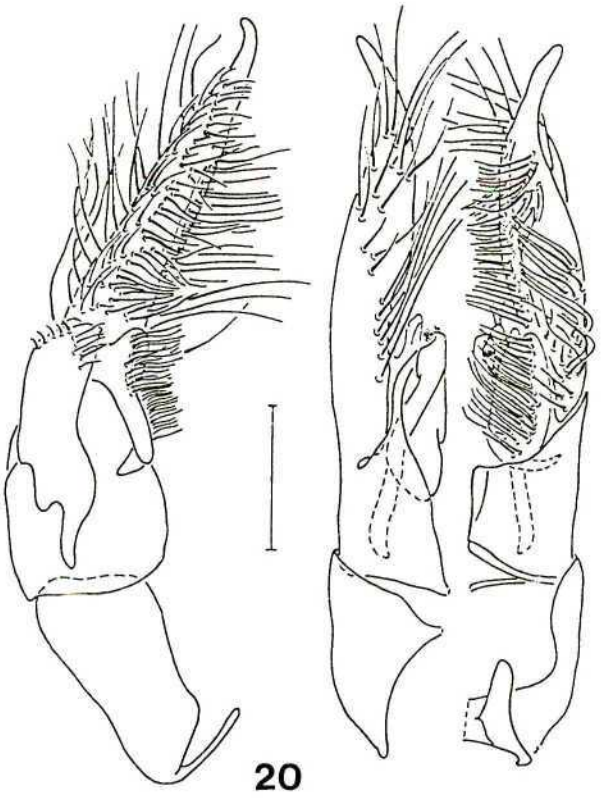

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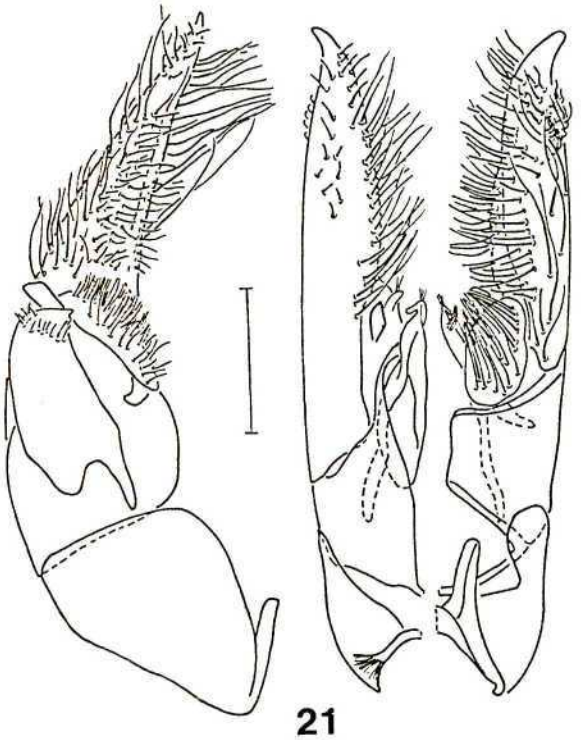

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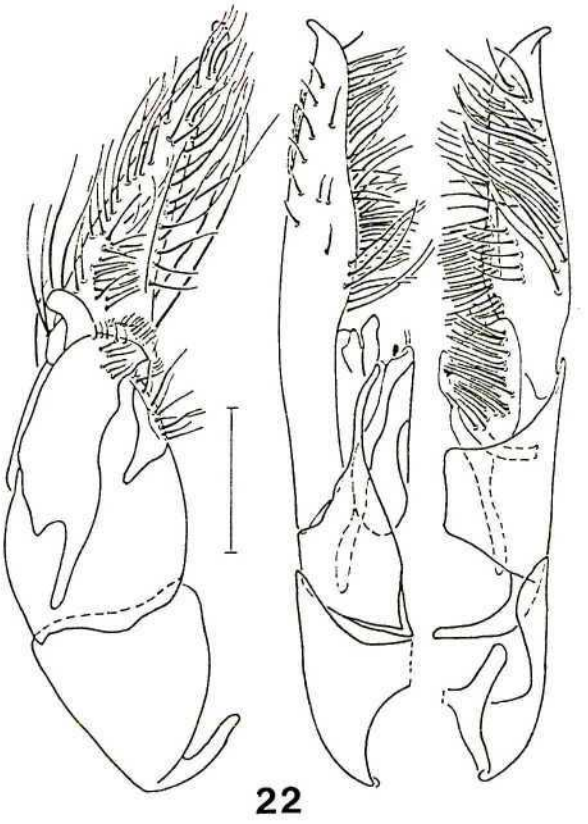

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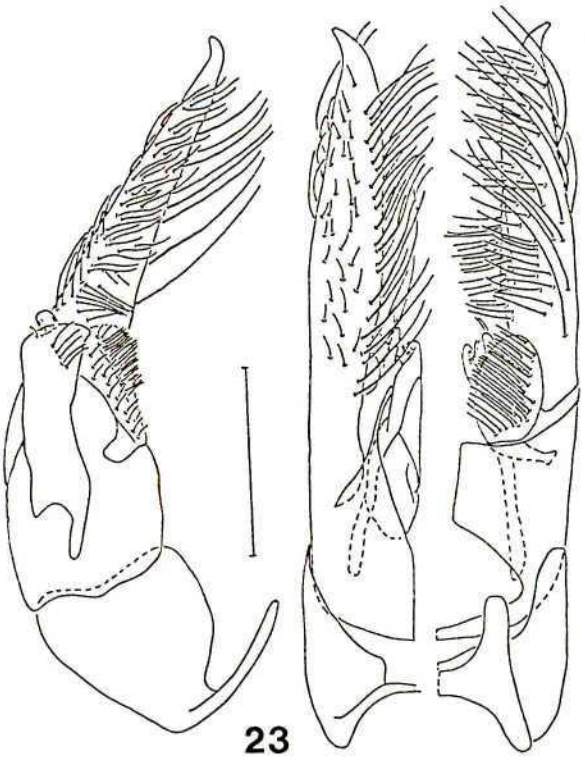
Figs 23-26. - *Tricholabiodes* spp, ♂, genitalia: 23) *T. trochantalis*; 24) *T. pedunculatus*; 25) *T. palaestinensis*; 26) *T. protuberans*. (Scale = 0.5 mm).



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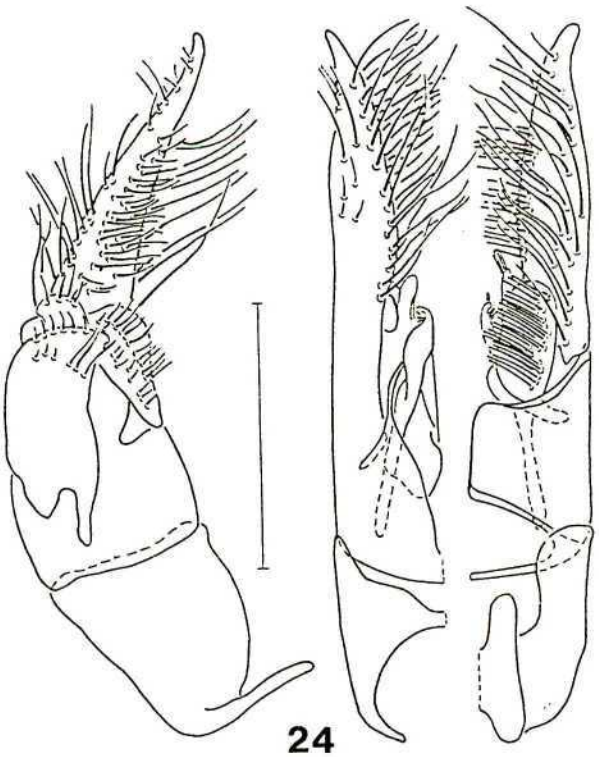

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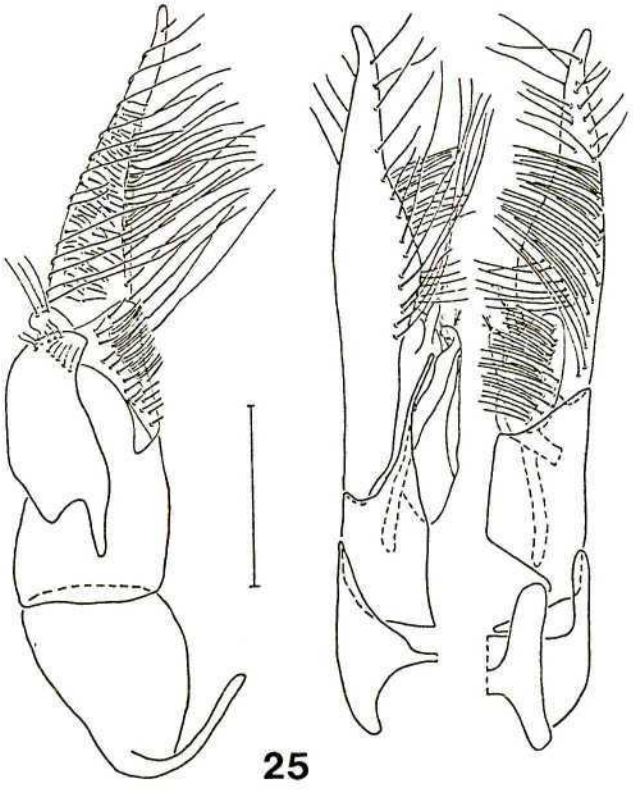

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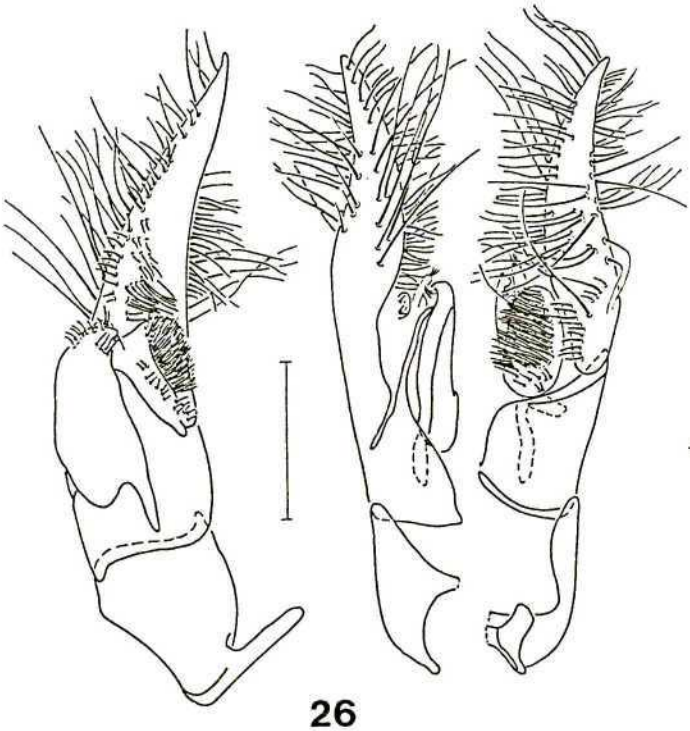

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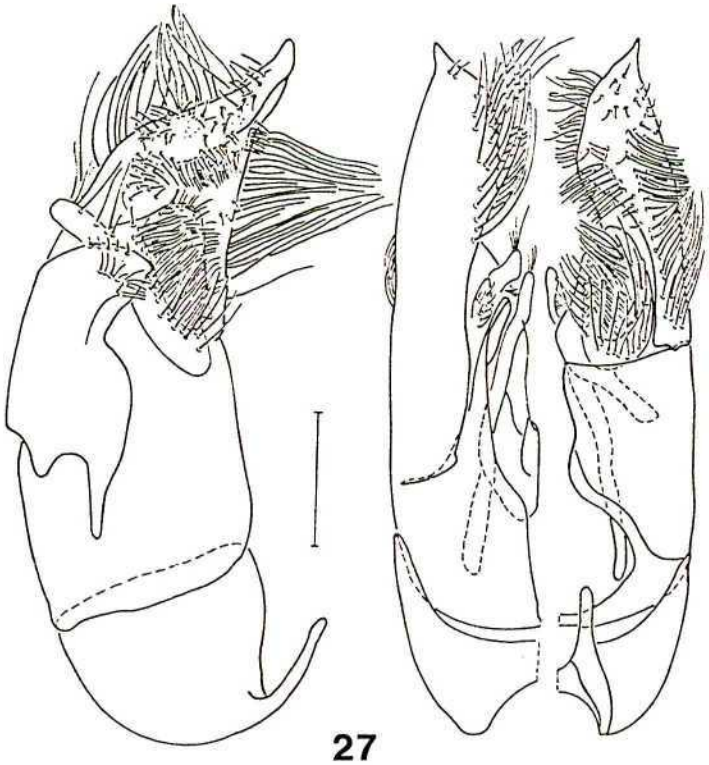
Figs 27-30. - *Tricholabiodes* spp, ♂, genitalia: 27) *T. brothersi*; 28) *T. nodosus*; 29) *T. nursei*; 30) *T. marmaricus*. (Scale = 0.5 mm).



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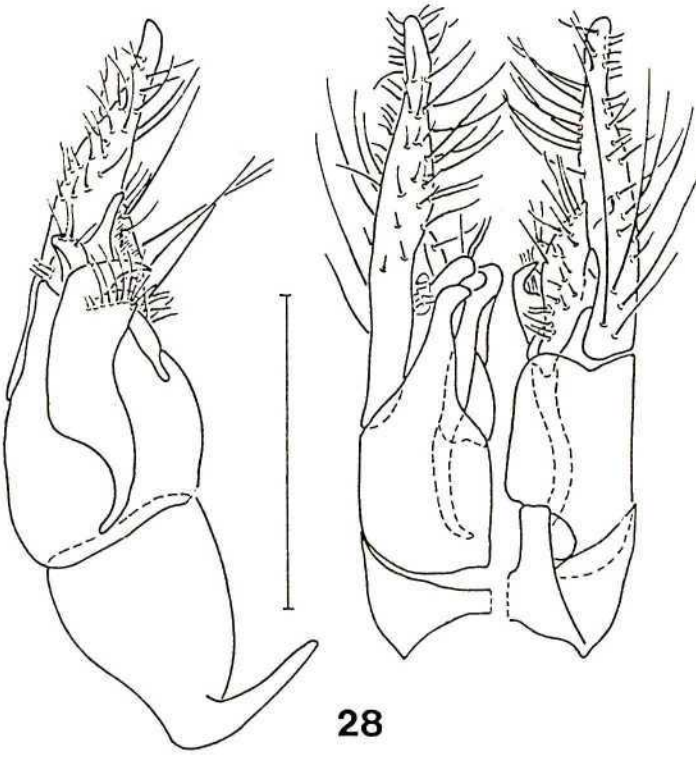

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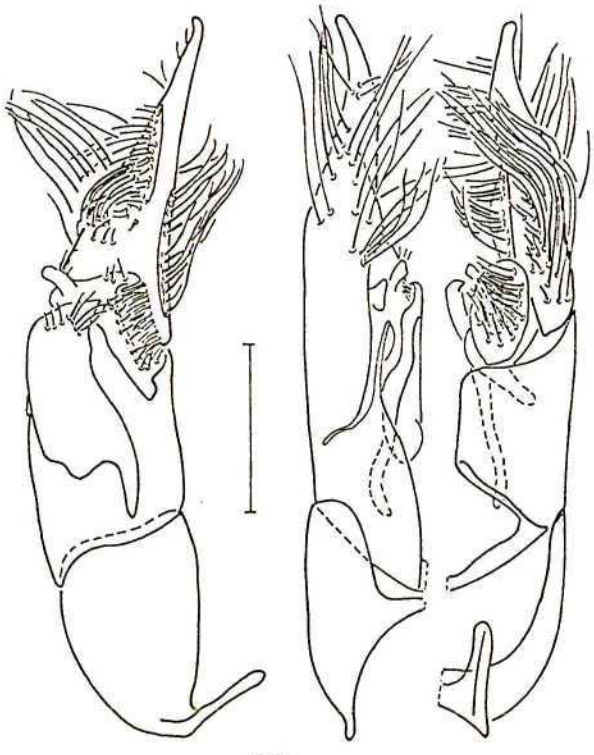

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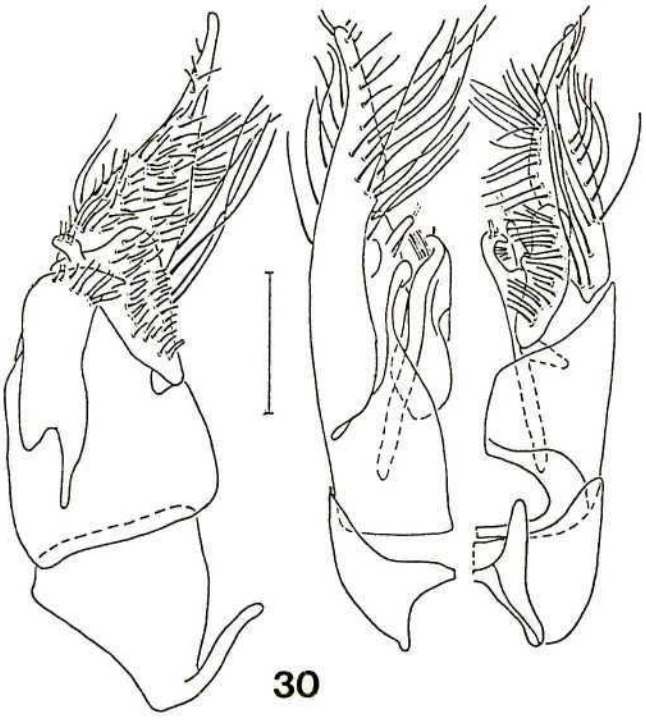

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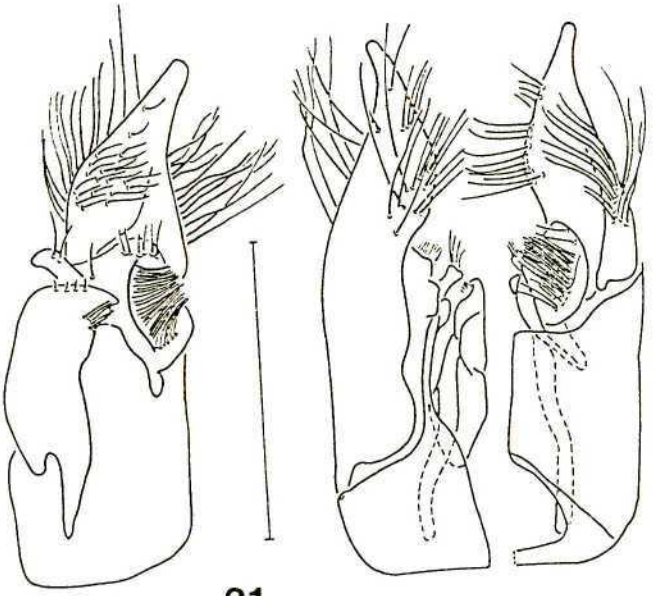
Figs 31-34. - *Tricholabiodes* spp, ♂, genitalia: 31) *T. recurvatus* (basal ring not drawn because it was damaged during dissection); 32) *T. tharensis*; 33) *T. longicarinatus*; 34) *T. carinifer*. (Scale = 0.5 mm).



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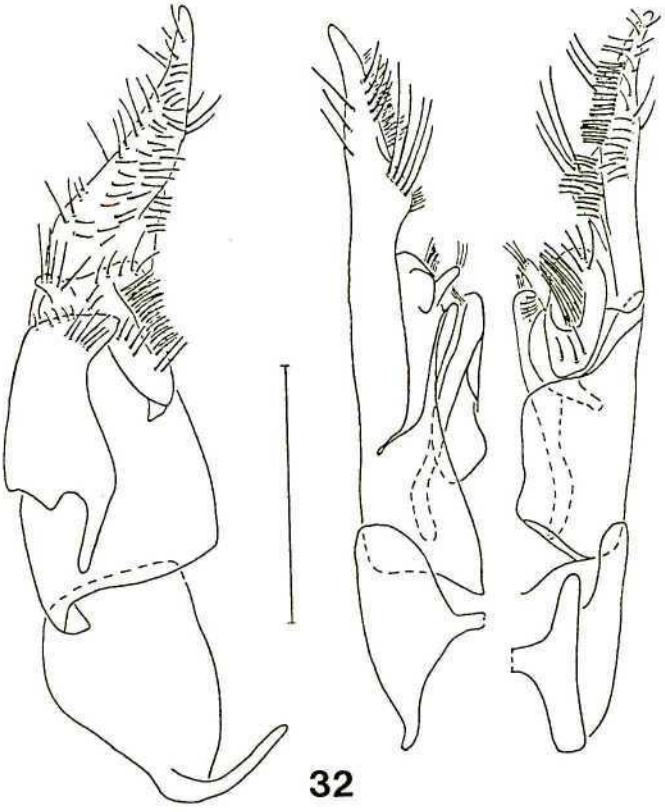

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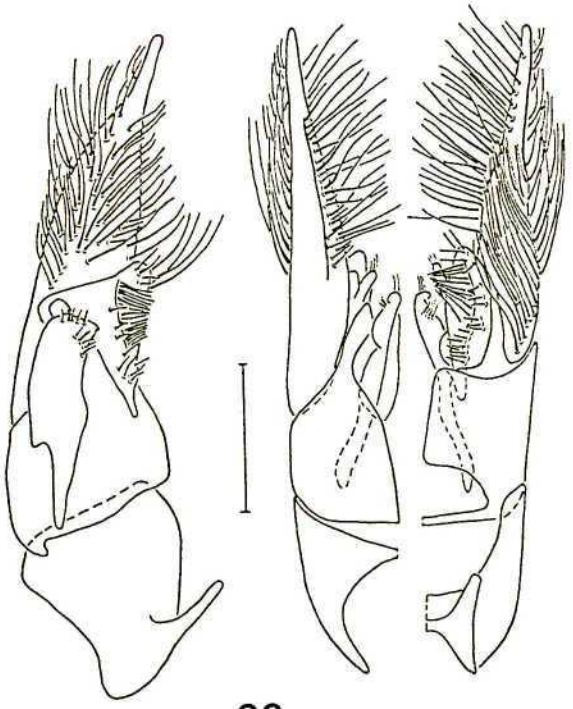

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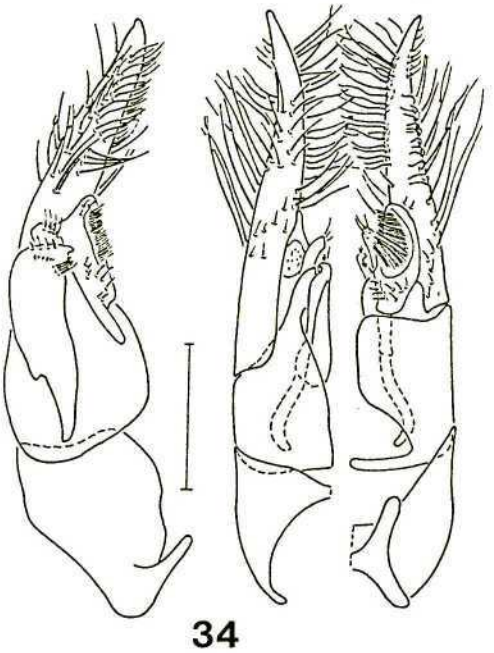

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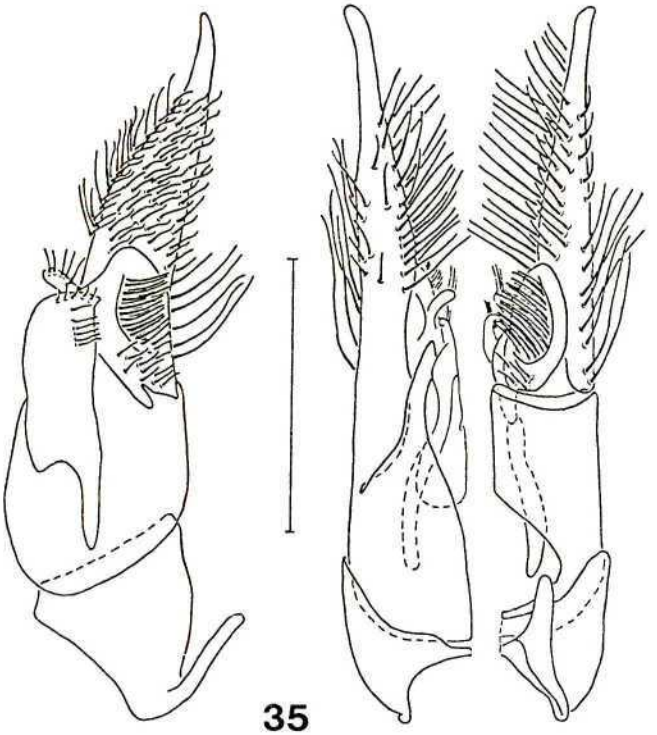
Figs 35-38. - *Tricholabiodes* spp, ♂, genitalia: 35) *T. signatipennis*; 36) *T. andrei*; 37) *T. stigmaticus*; 38) *T. pallidus*. (Scale = 0.5 mm).



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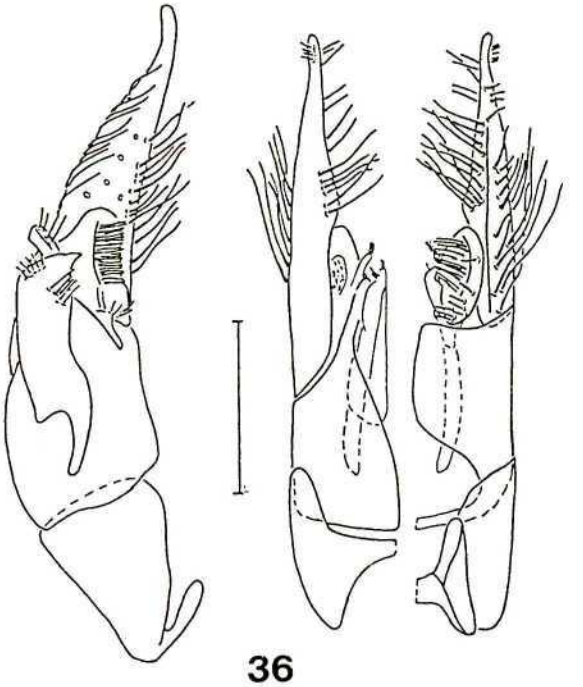

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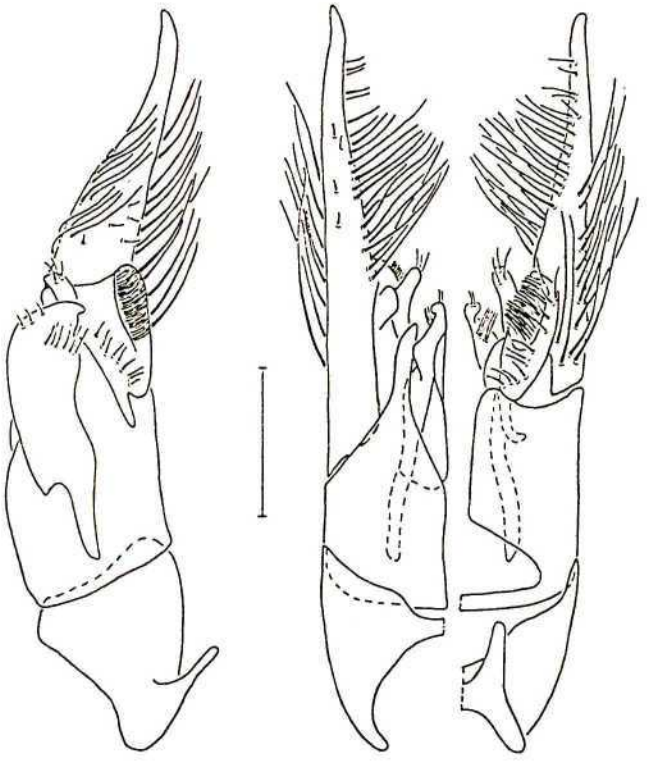

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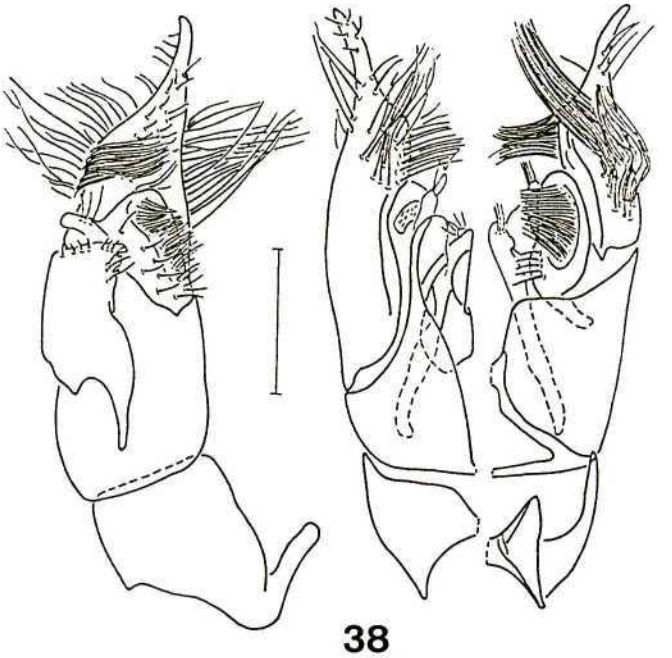

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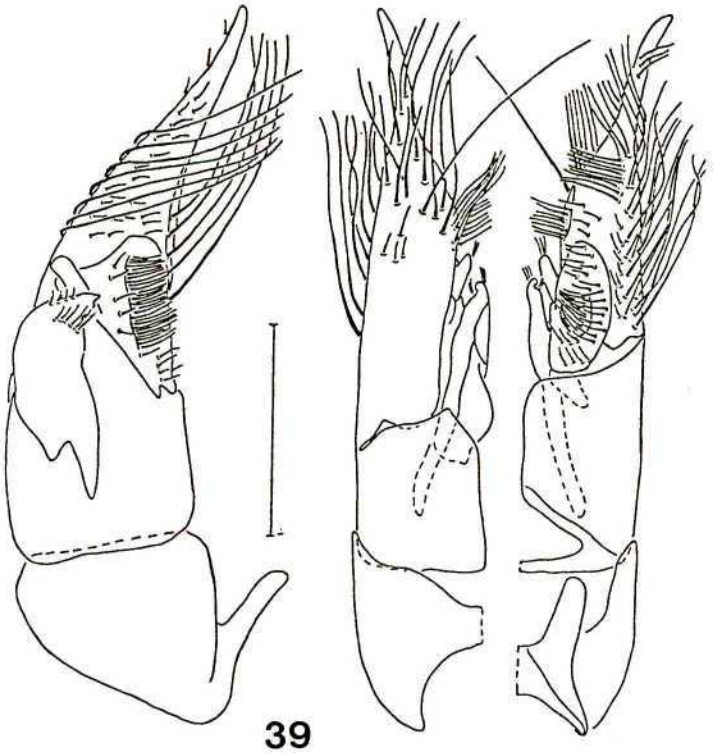
Figs 39-42. - *Tricholabiodes* spp, ♂, genitalia: 39) *T. ferrugineus*; 40) *T. asiaticus*; 41) *T. sinuatus*; 42) *T. nonveilleri*. (Scale = 0.5 mm).



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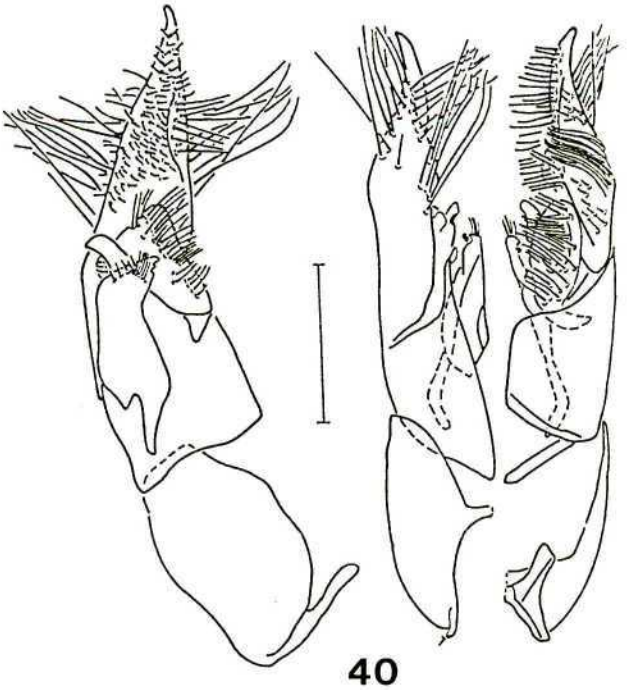

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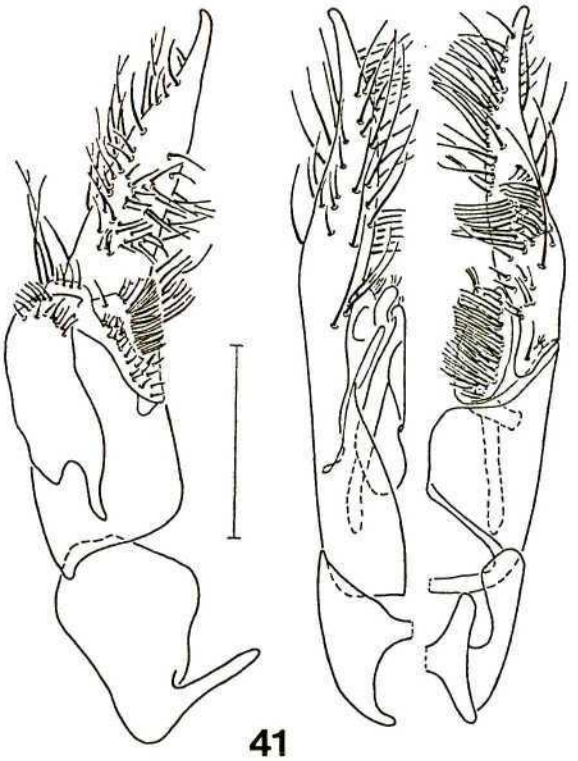

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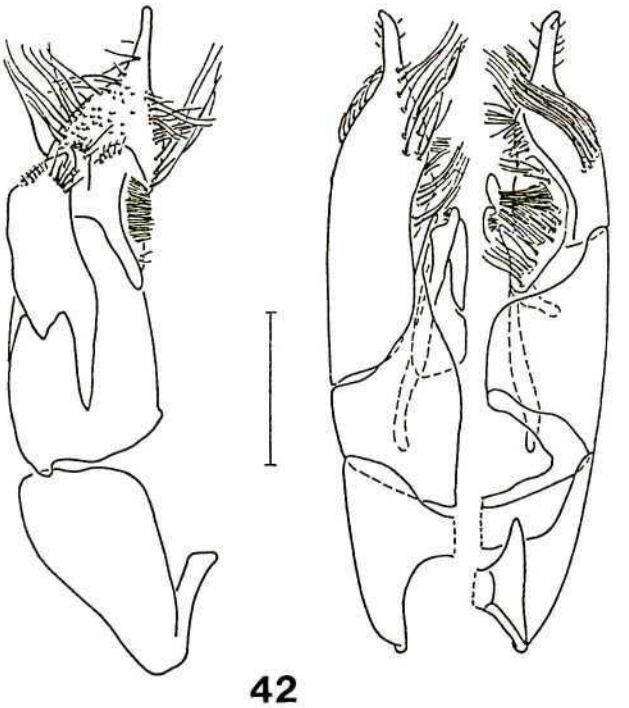
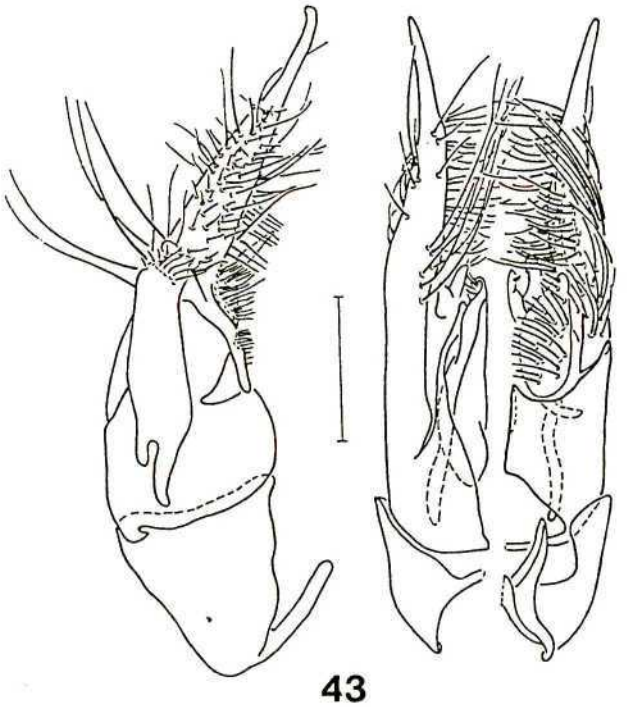


42

Figs 43-46. - *Tricholabiodes* spp, ♂, genitalia: 43) *T. pedunculatoides*; 44) *T. parallelus*; 45) *T. beludzhistanus* (basal ring not drawn because it was damaged during dissection); 46) *T. garamantis*. (Scale = 0.5 mm).



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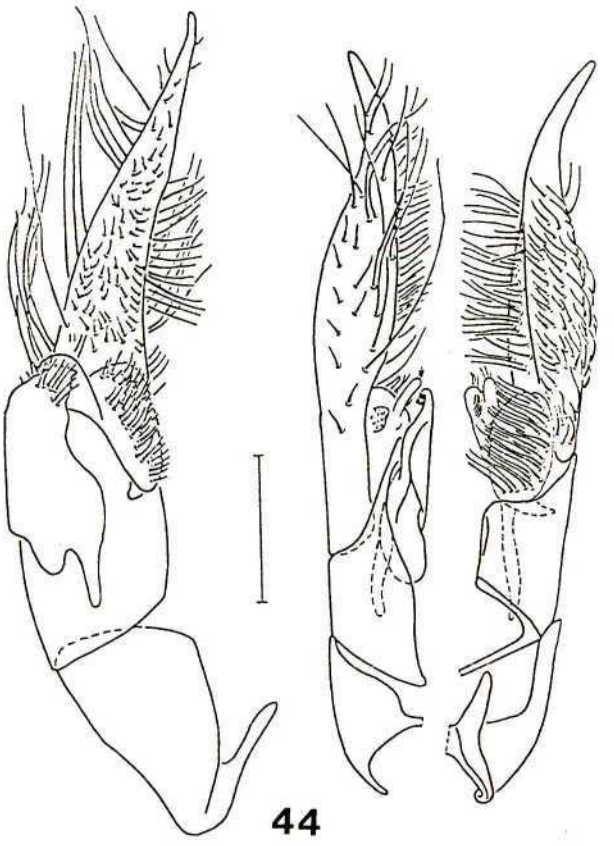

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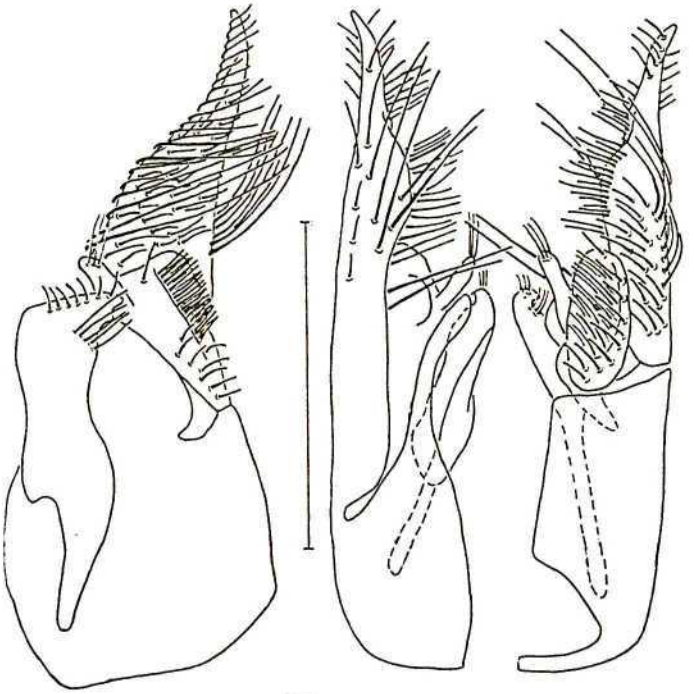

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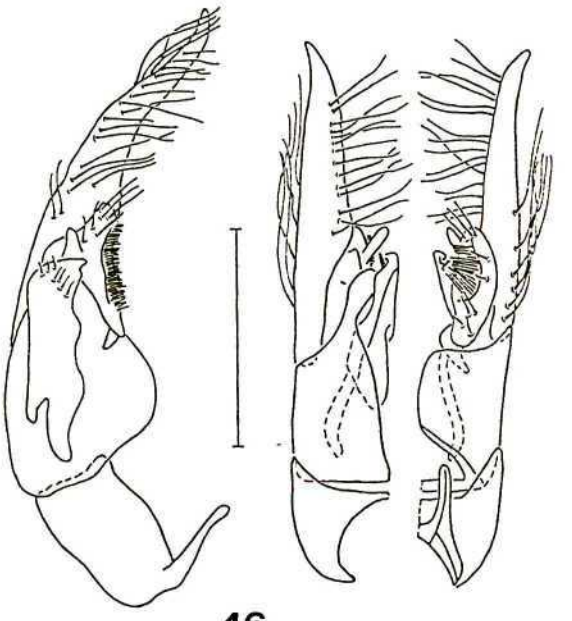
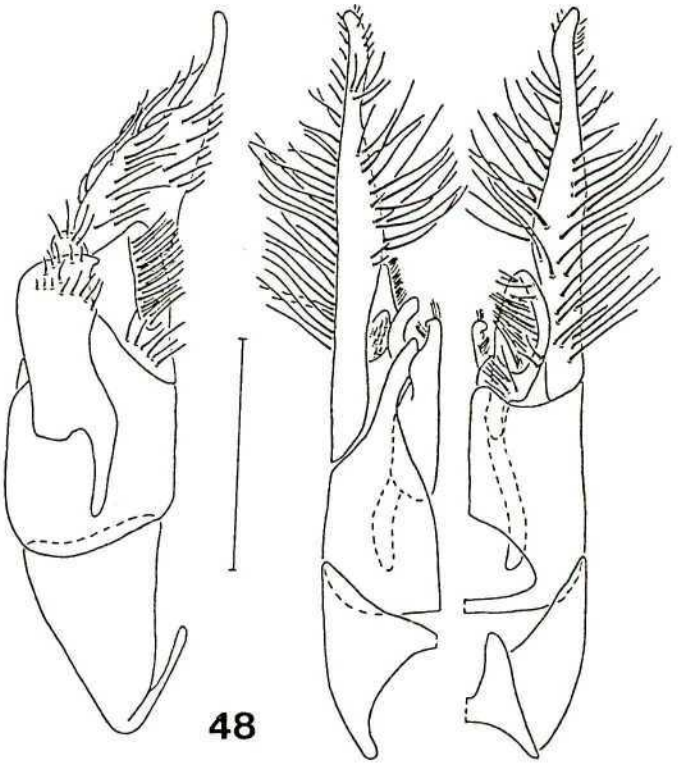


46

Figs 47-50. - *Tricholabiodes* spp, ♂, genitalia: 47) *T. bactrianus*; 48) *T. paulocellatus*; 49) *T. alveolus*; 50) *T. thisbe*. (Scale = 0.5 mm).

47



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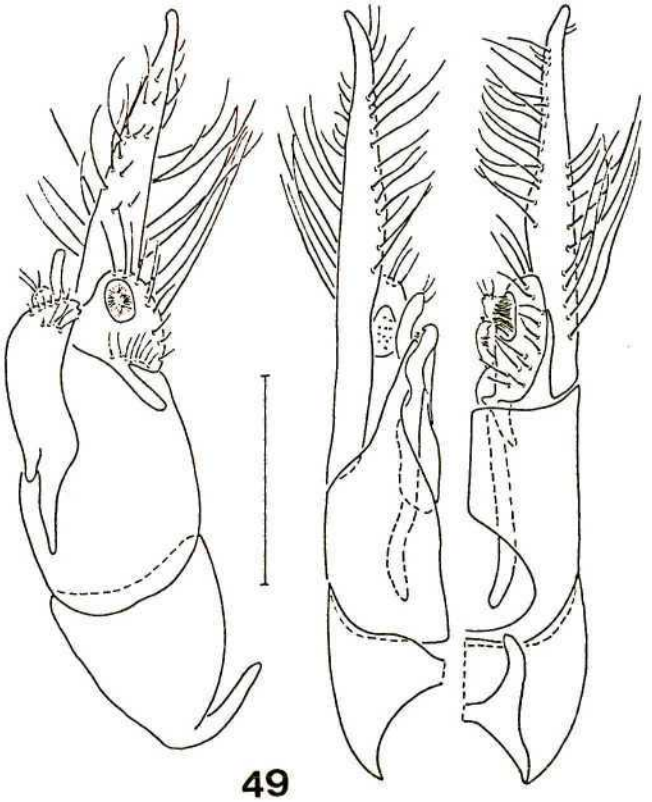

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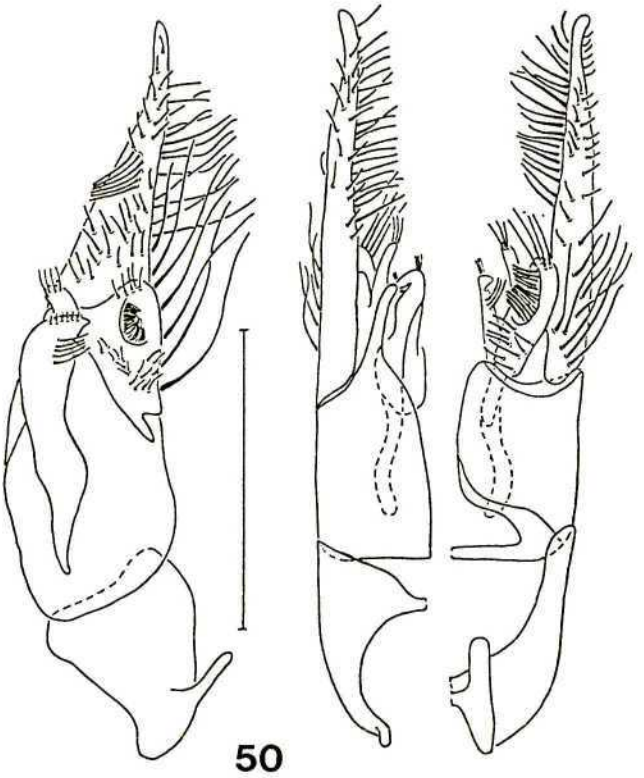
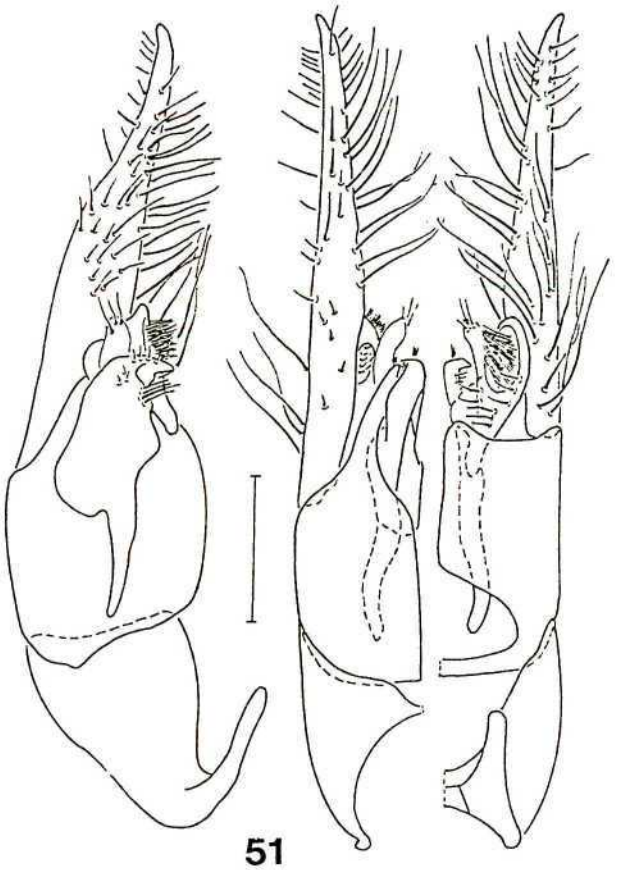


50

Figs 51-54. - *Tricholabiodes* spp, ♂, genitalia: 51) *T. thisboides*; 52) *T. disgregus*; 53) *T. mandibularis*; 54) *T. denticulatus*. (Scale = 0.5 mm).



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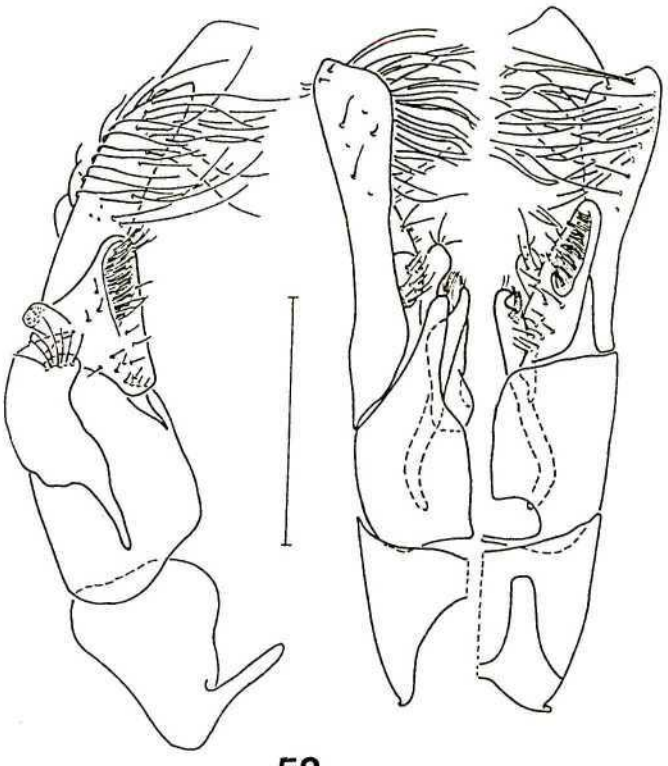

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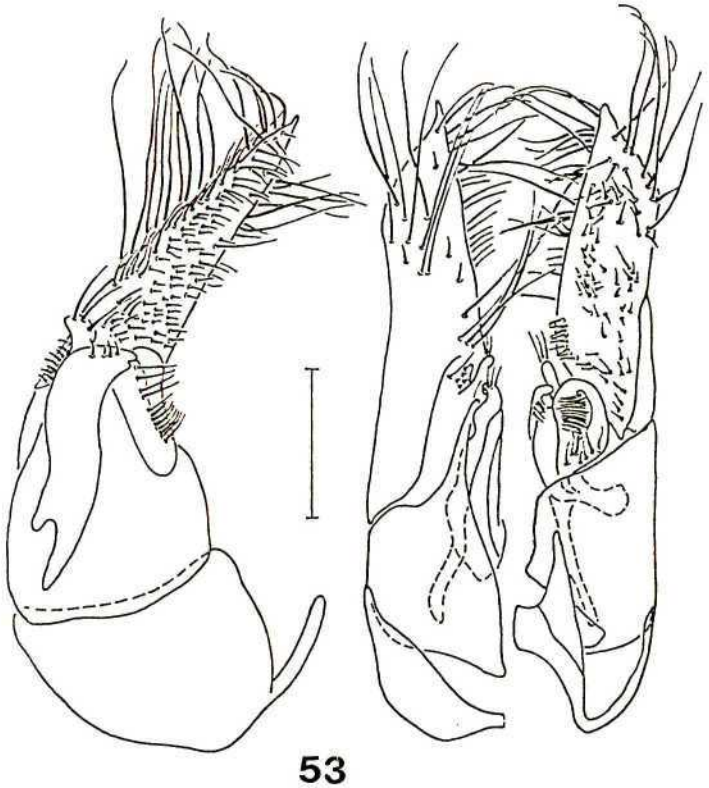

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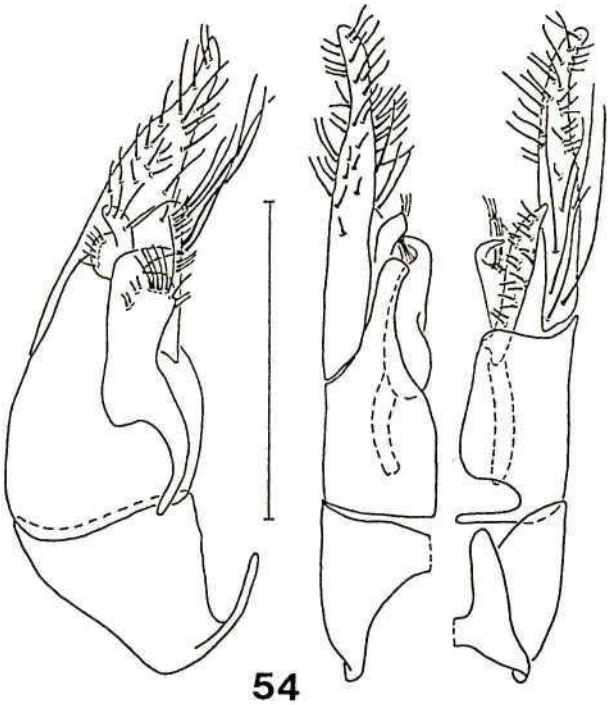
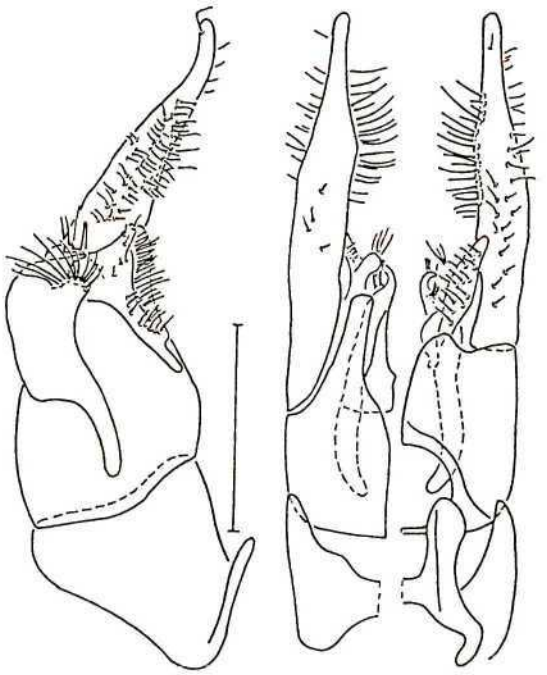


54

Figs 55-58. - *Tricholabiodes* spp, ♂, genitalia: 55) *T. concavus*; 56) *T. testaceus*; 57) *T. inornatus*; 58) *T. lividus*. (Scale = 0.5 mm).



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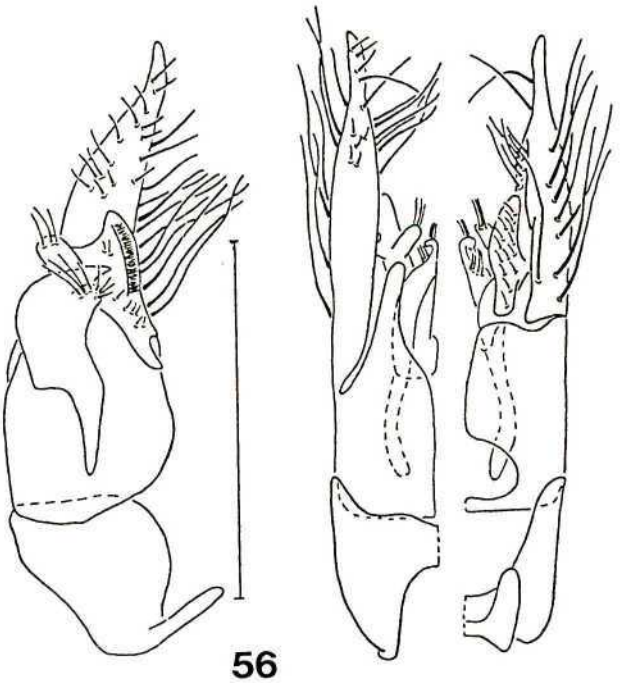

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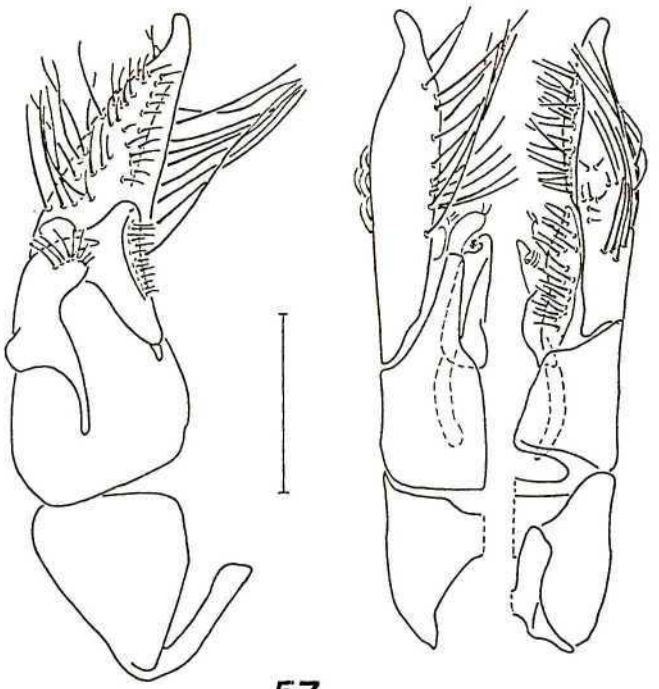

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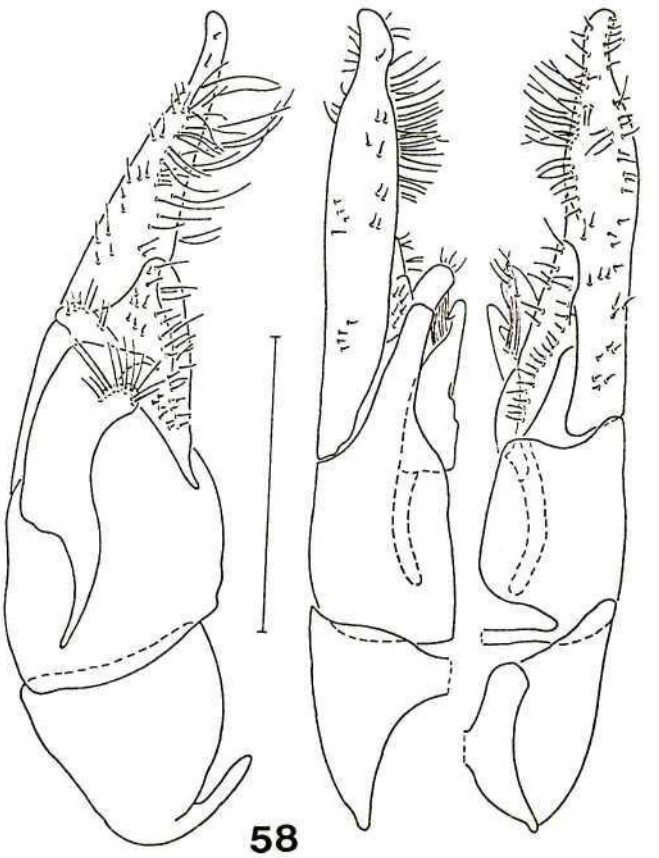
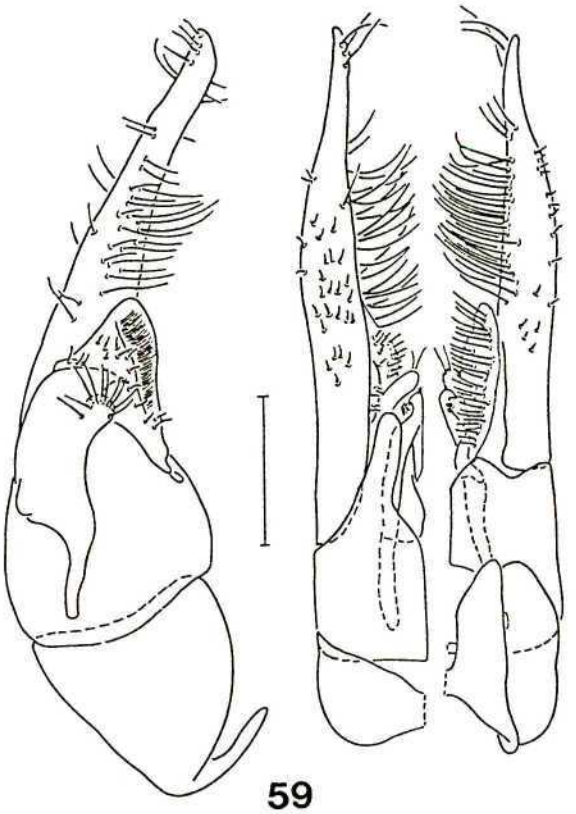


58

Figs 59-62. - *Tricholabiodes* spp, ♂, genitalia: 59) *T. imbellis*; 60) *T. pallidior*; 61) *T. tortilis*; 62) *T. petiolatus*. (Scale = 0.5 mm).



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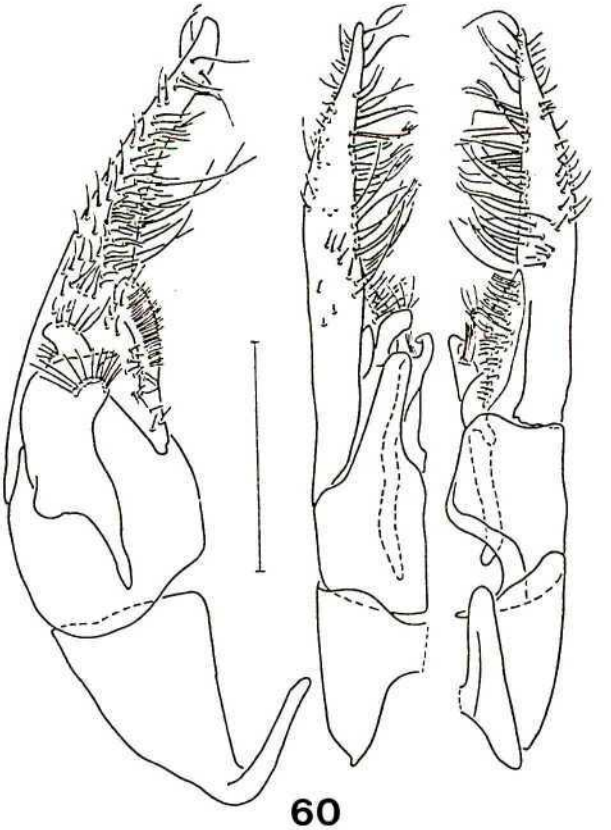

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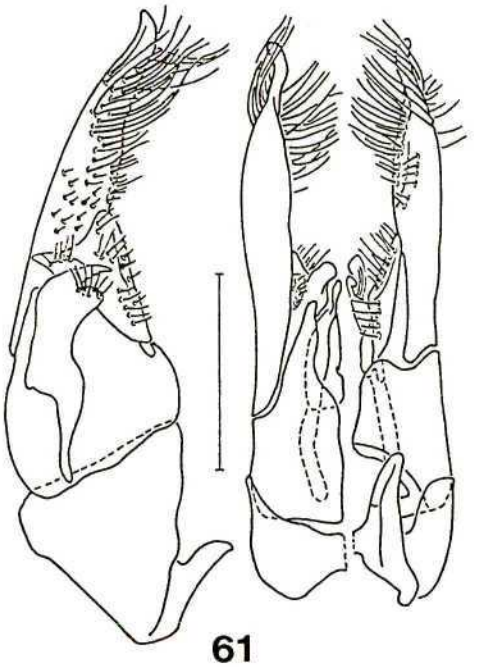

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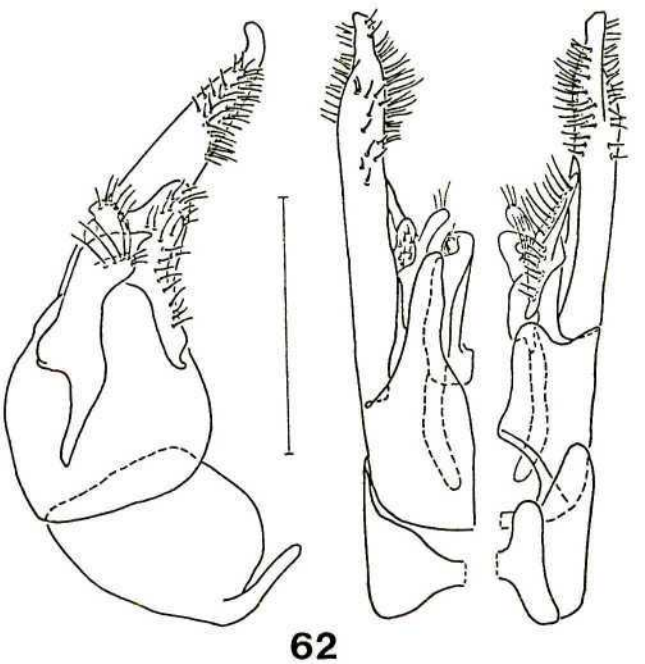
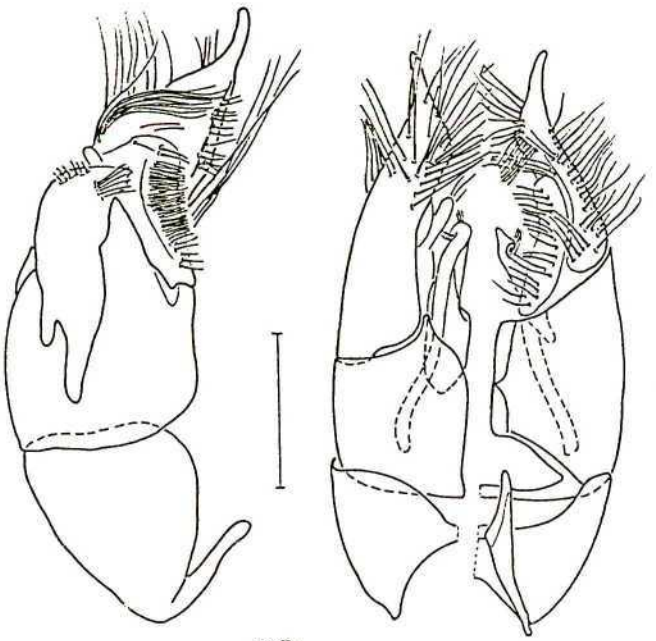


62

Figs 63-66. - *Tricholabiodes* spp, ♂, genitalia: 63) *T. pallidicornis*; 64) *T. scorteccii*; 65) *T. luridus*; 66) *T. saharicus*. (Scale = 0.5 mm).



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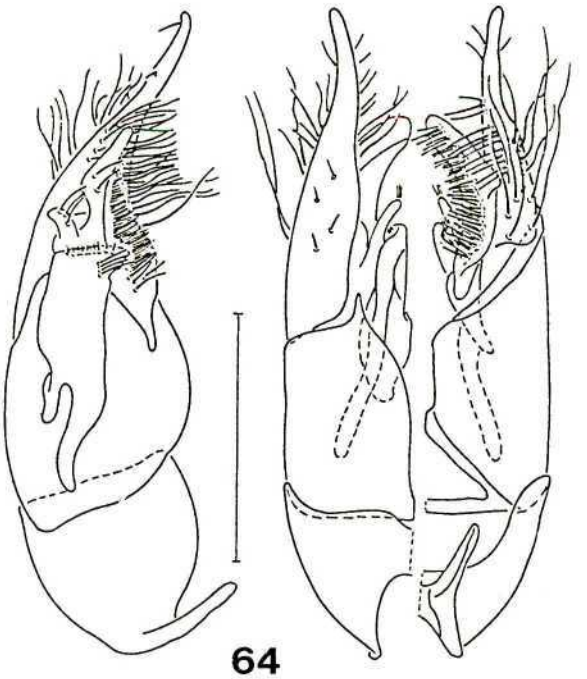

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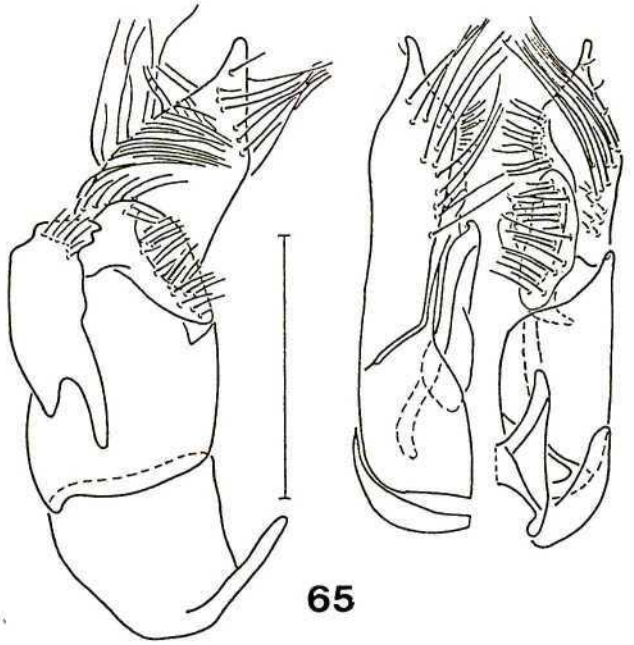

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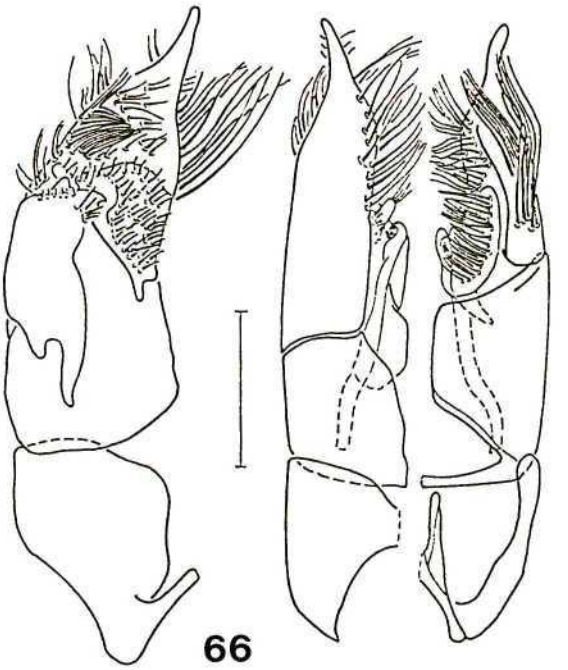
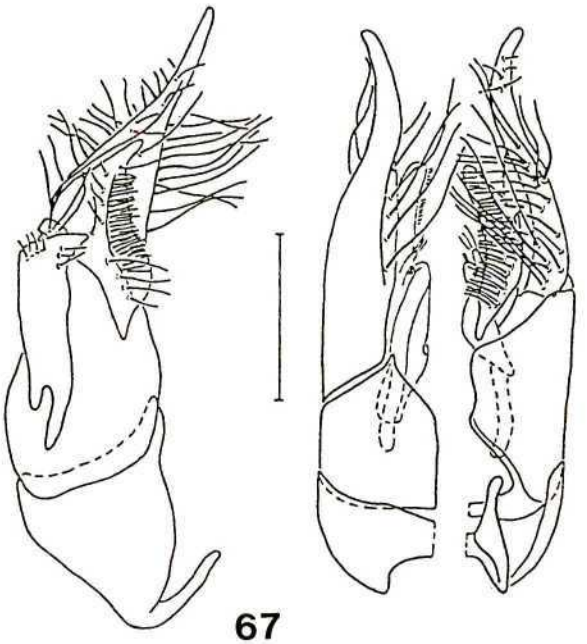


66

Figs 67-70. - *Tricholabiodes* spp, ♂, genitalia: 67) *T. arabicus*; 68) *T. acer*; 69) *T. indistinctus*; 70) *T. niloticus niloticus*. (Scale = 0.5 mm).



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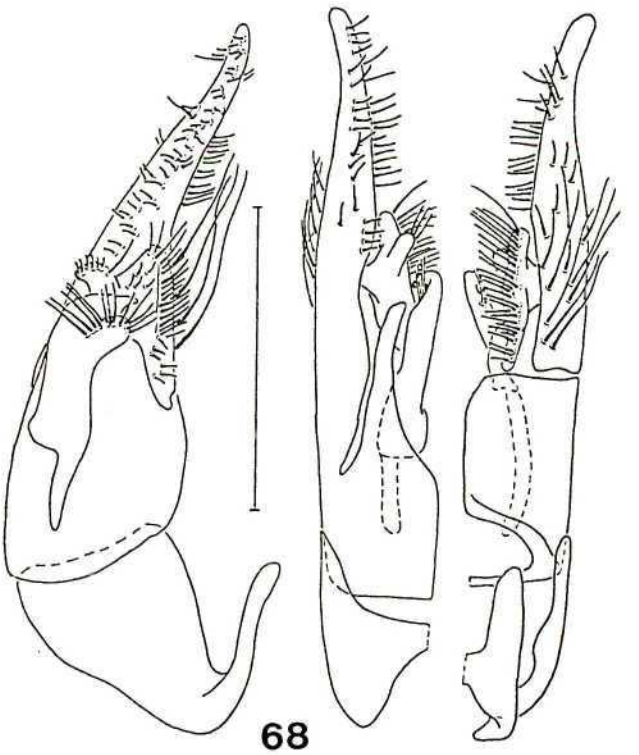

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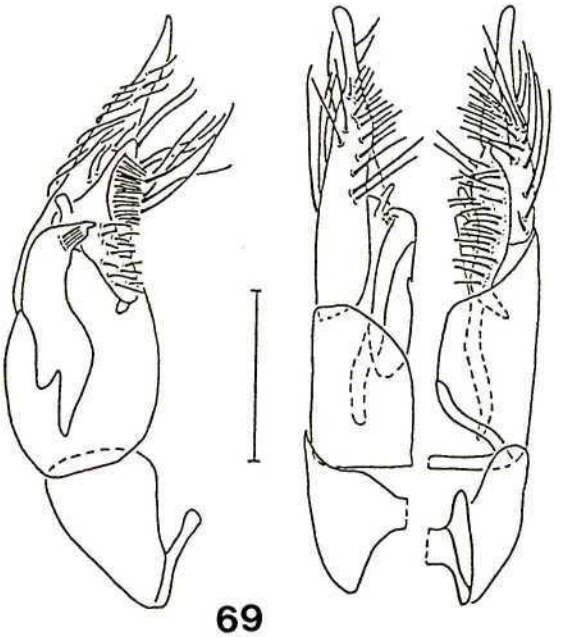

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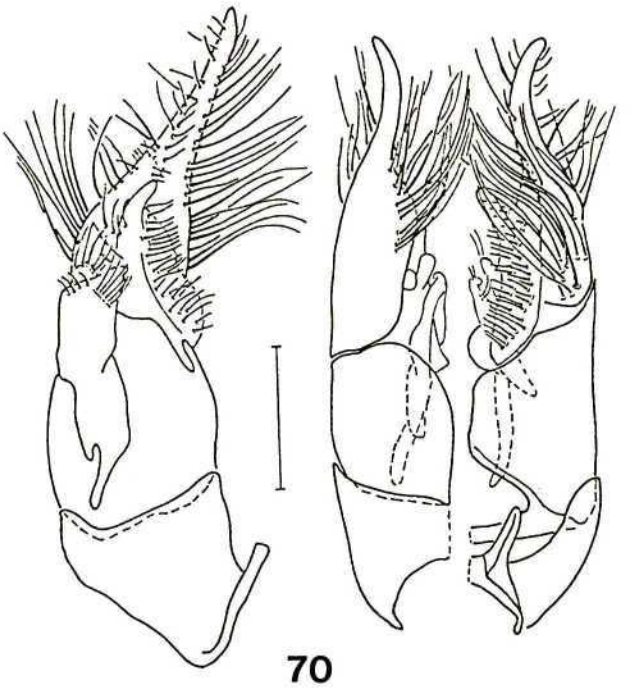
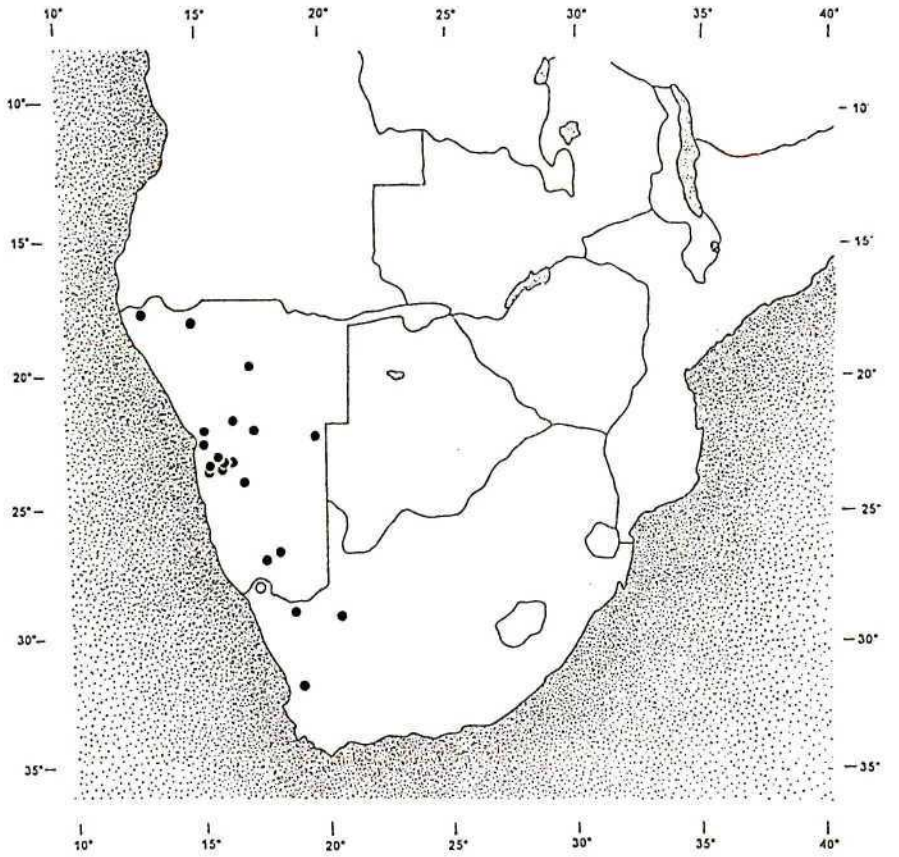


70

Fig. 71. - The distribution of *T. denticulatus* (○) and *T. nodosus* (●).

Fig. 72. - The distribution of *T. disgregus* (●).



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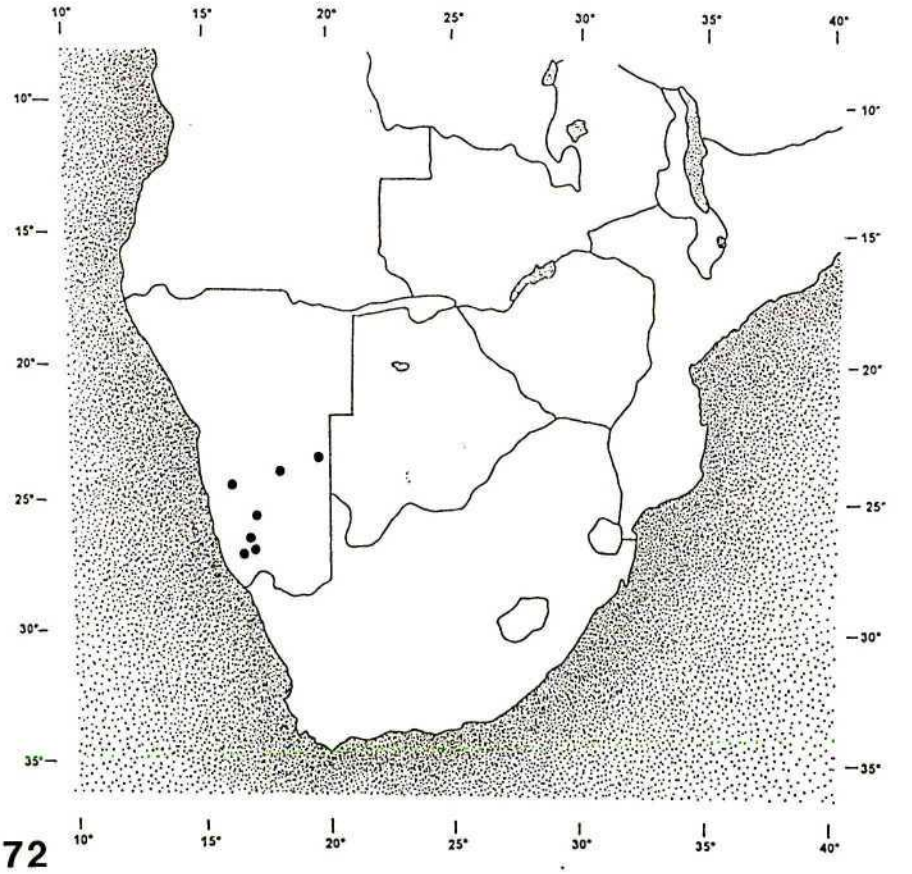
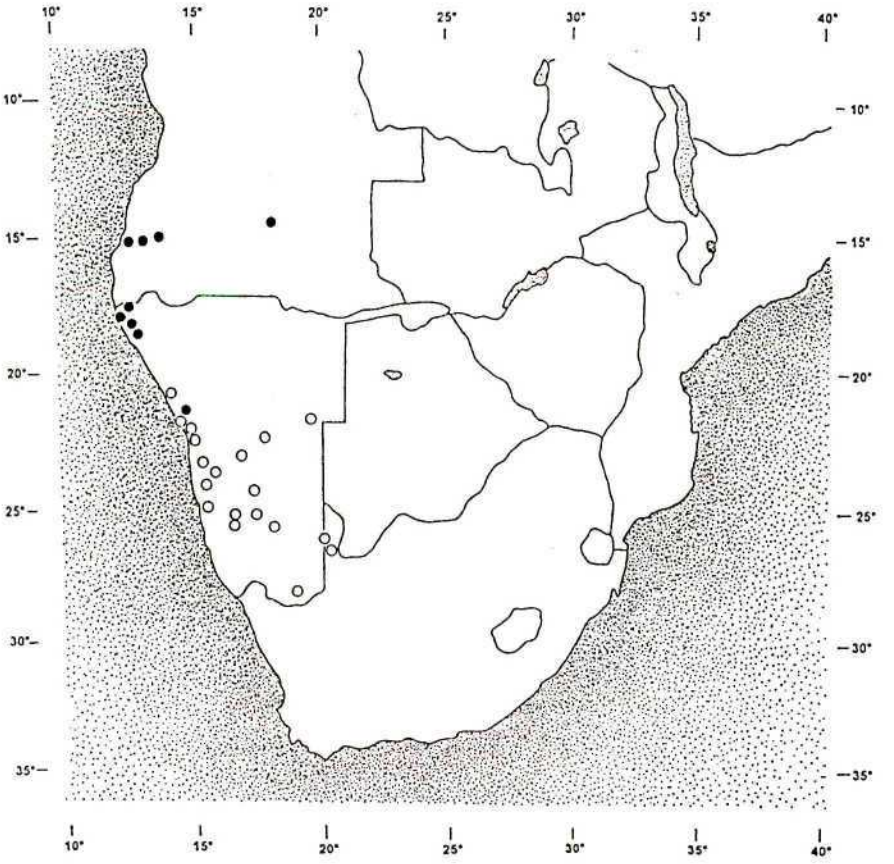


72

Fig. 73. - The distribution of *T. testaceus* (○) and *T. inornatus* (●).

Fig. 74. - The distribution of *T. lividus* (●).



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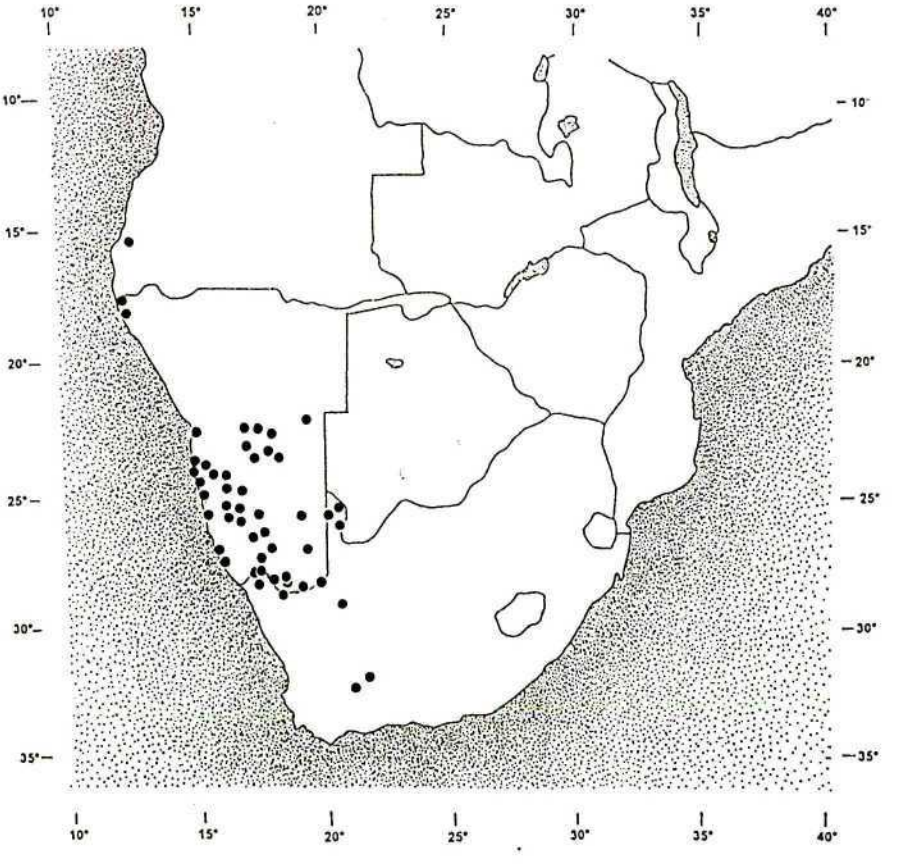
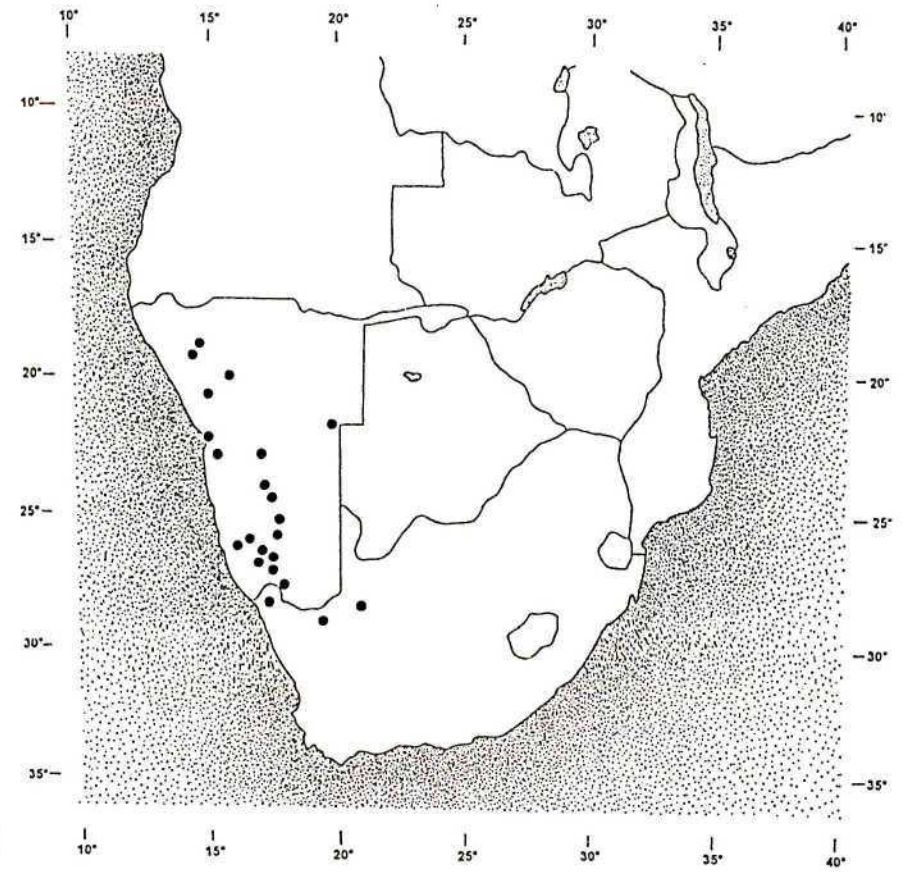


74

Fig. 75. - The distribution of *T. pallidior* (●).

Fig. 76. - The distribution of *T. concavus* (●) .



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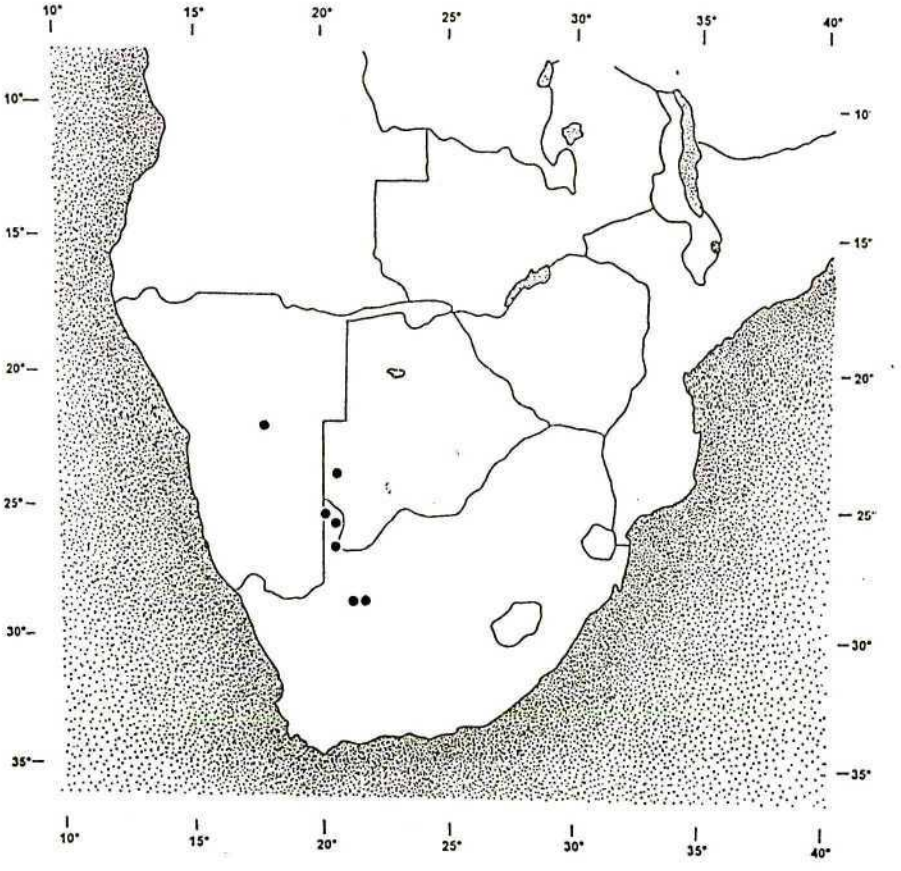
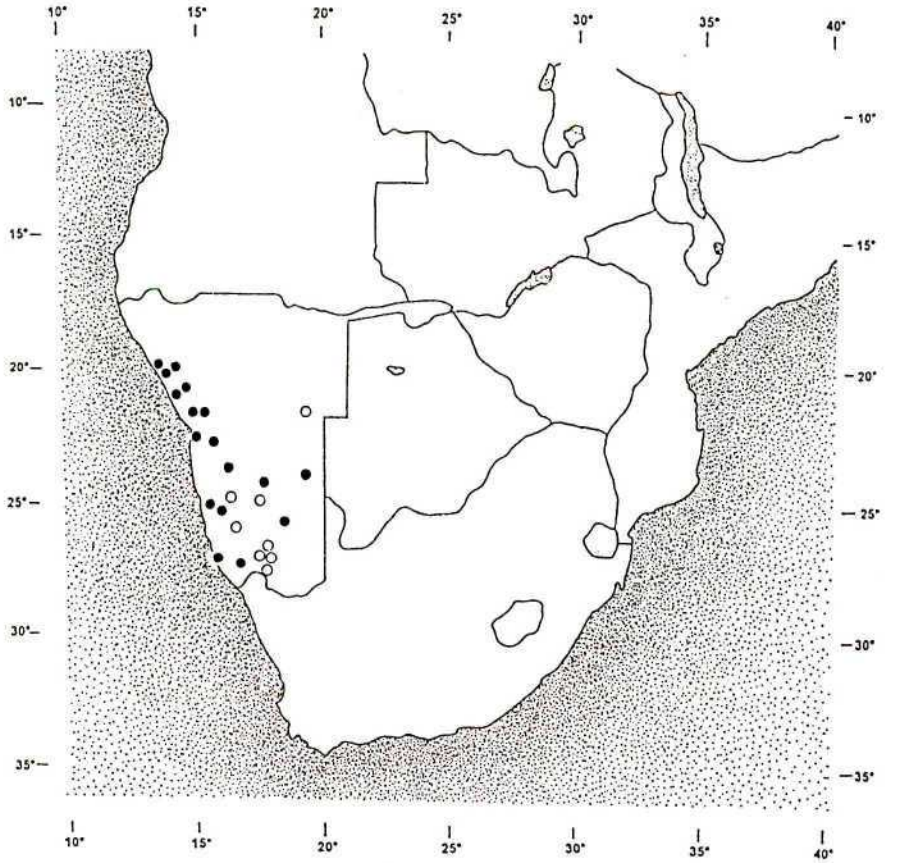


76

Fig. 77. - The distribution of *T. acer* (○) and *T. tortilis* (●).

Fig. 78. - The distribution of *T. petiolatus* (○) and *T. imbellis* (●).



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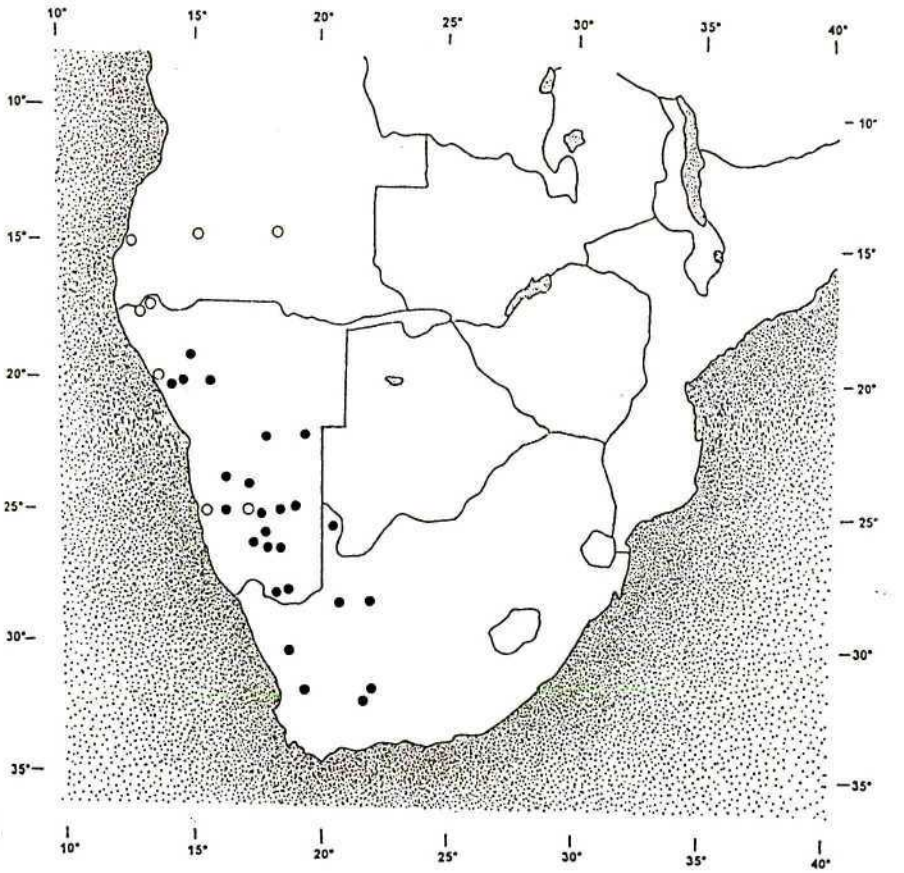
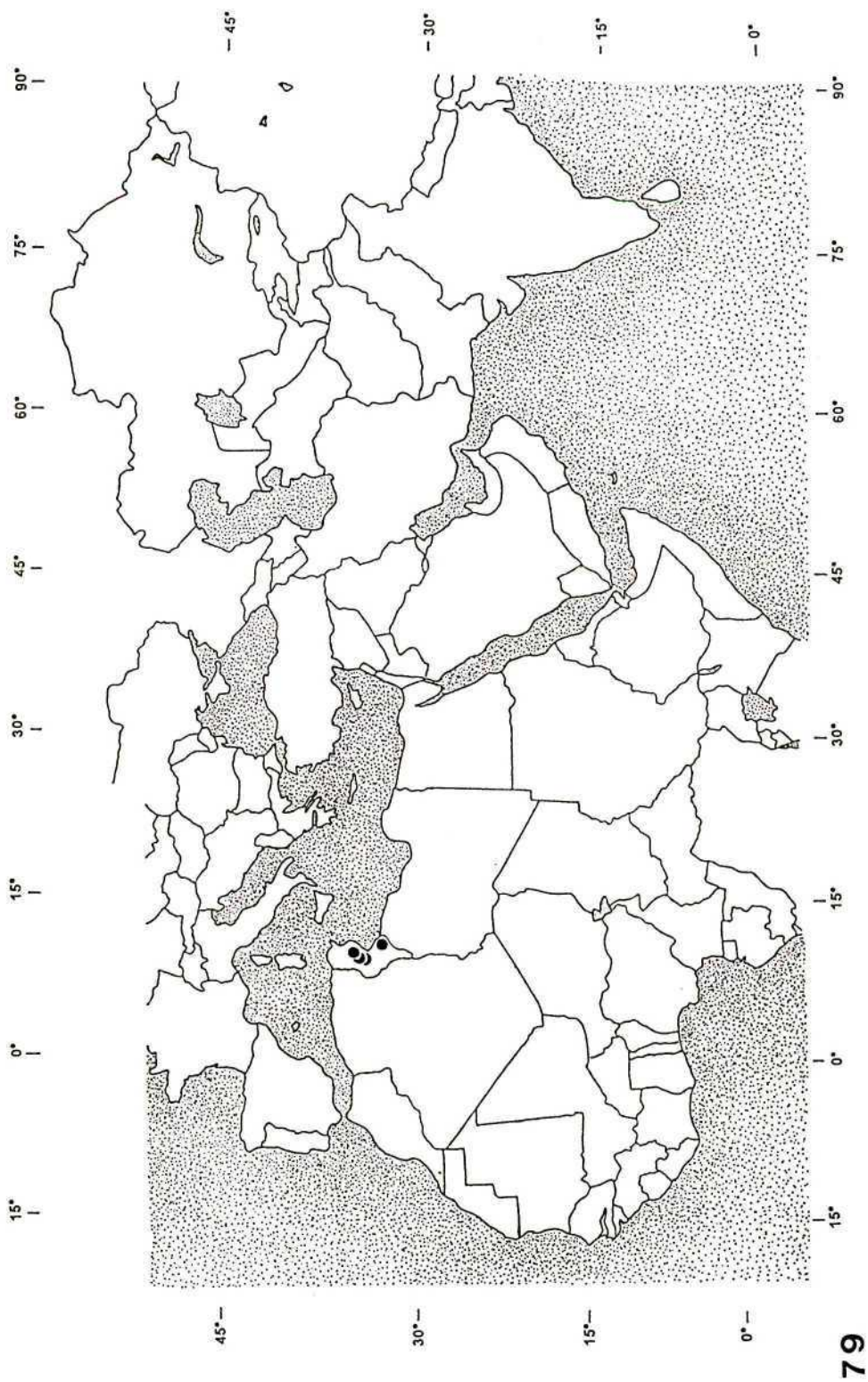


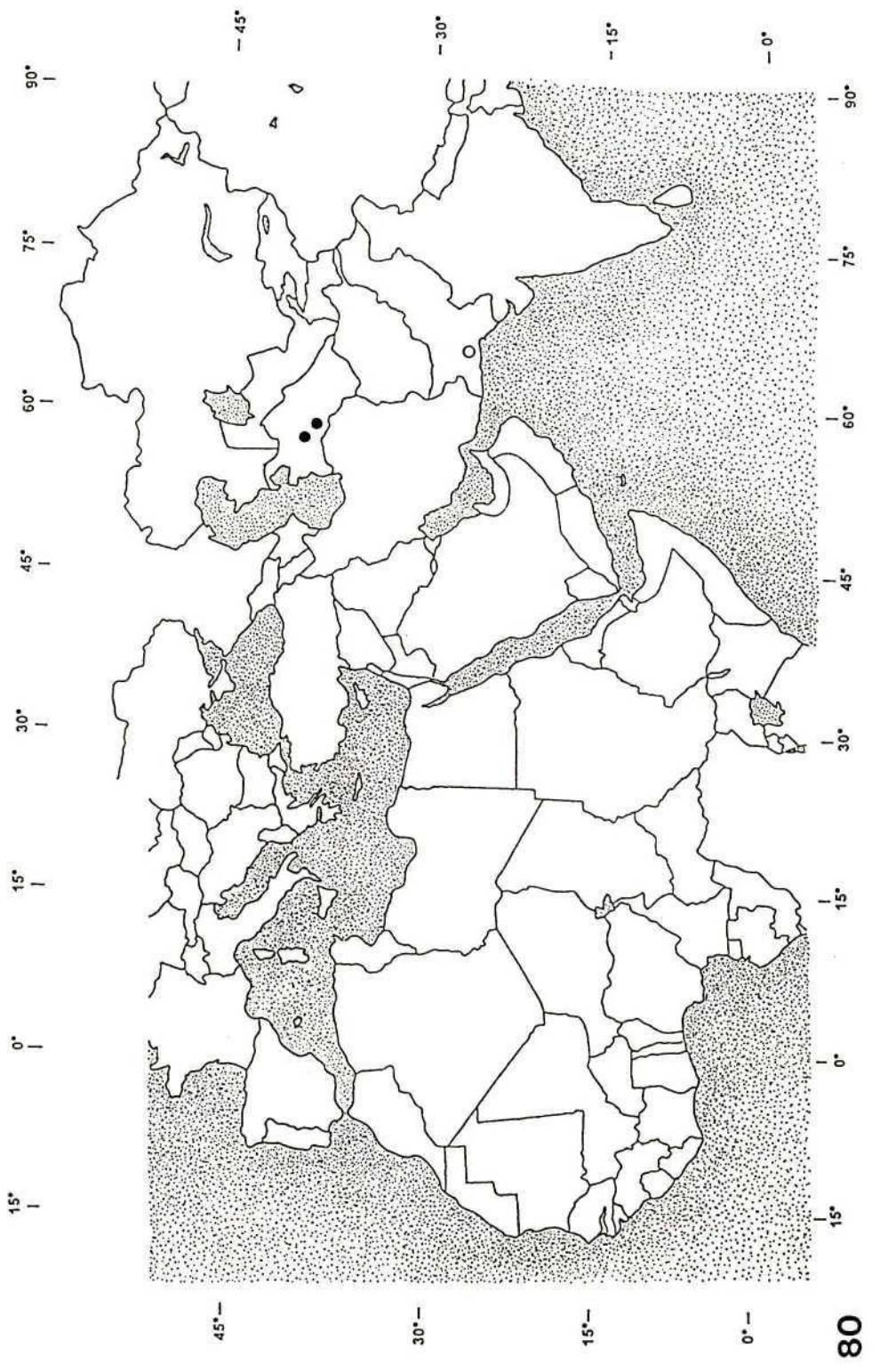
78

Fig. 79. - The distribution of *T. marmaricus* (●).



79

Fig. 80. - The distribution of *T. recurvatus* (○) and *T. bactrianus* (●).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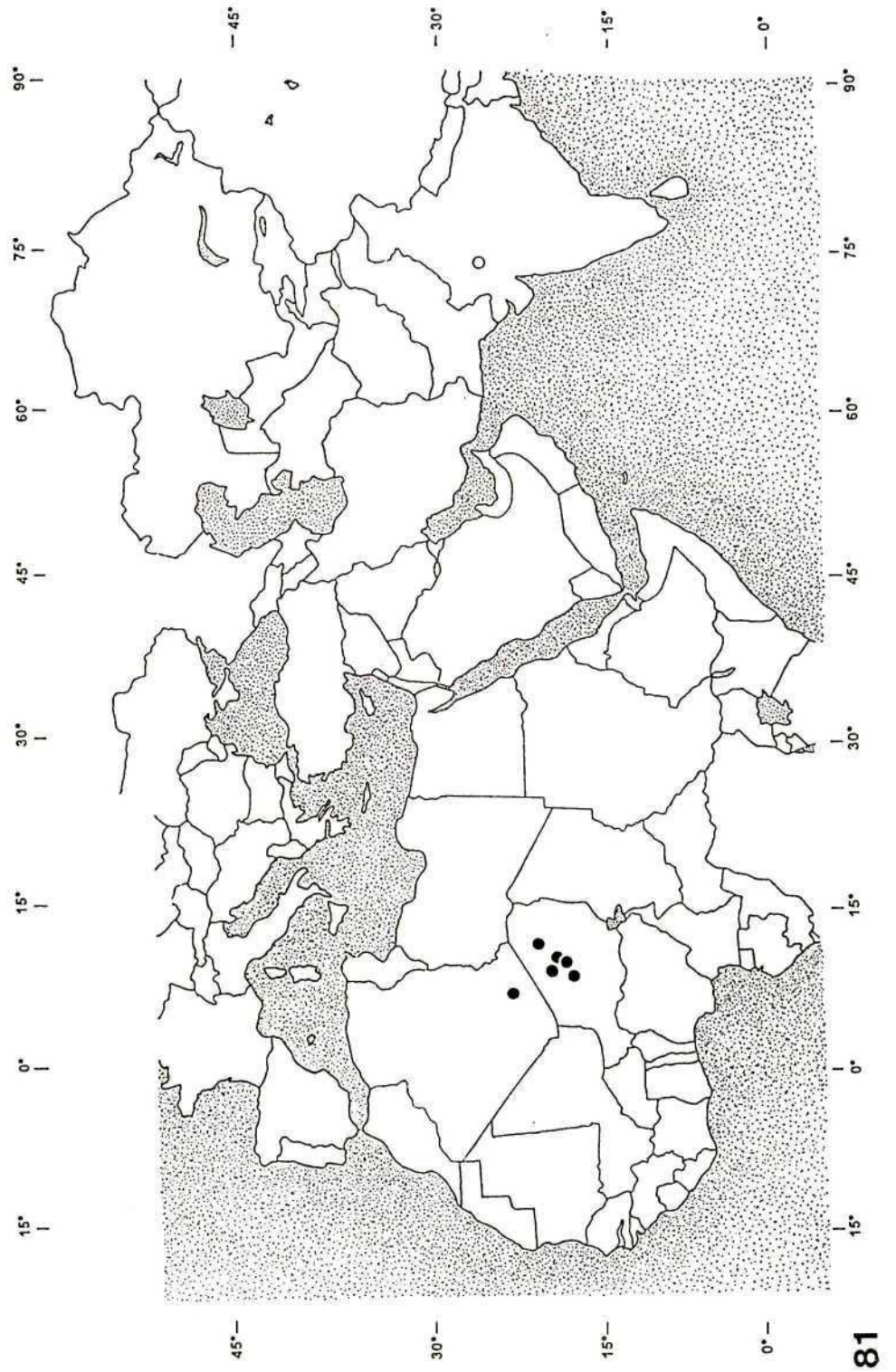
80

Fig. 81. - The distribution of *T. tharensis* (○) and *T. garamantis* (●).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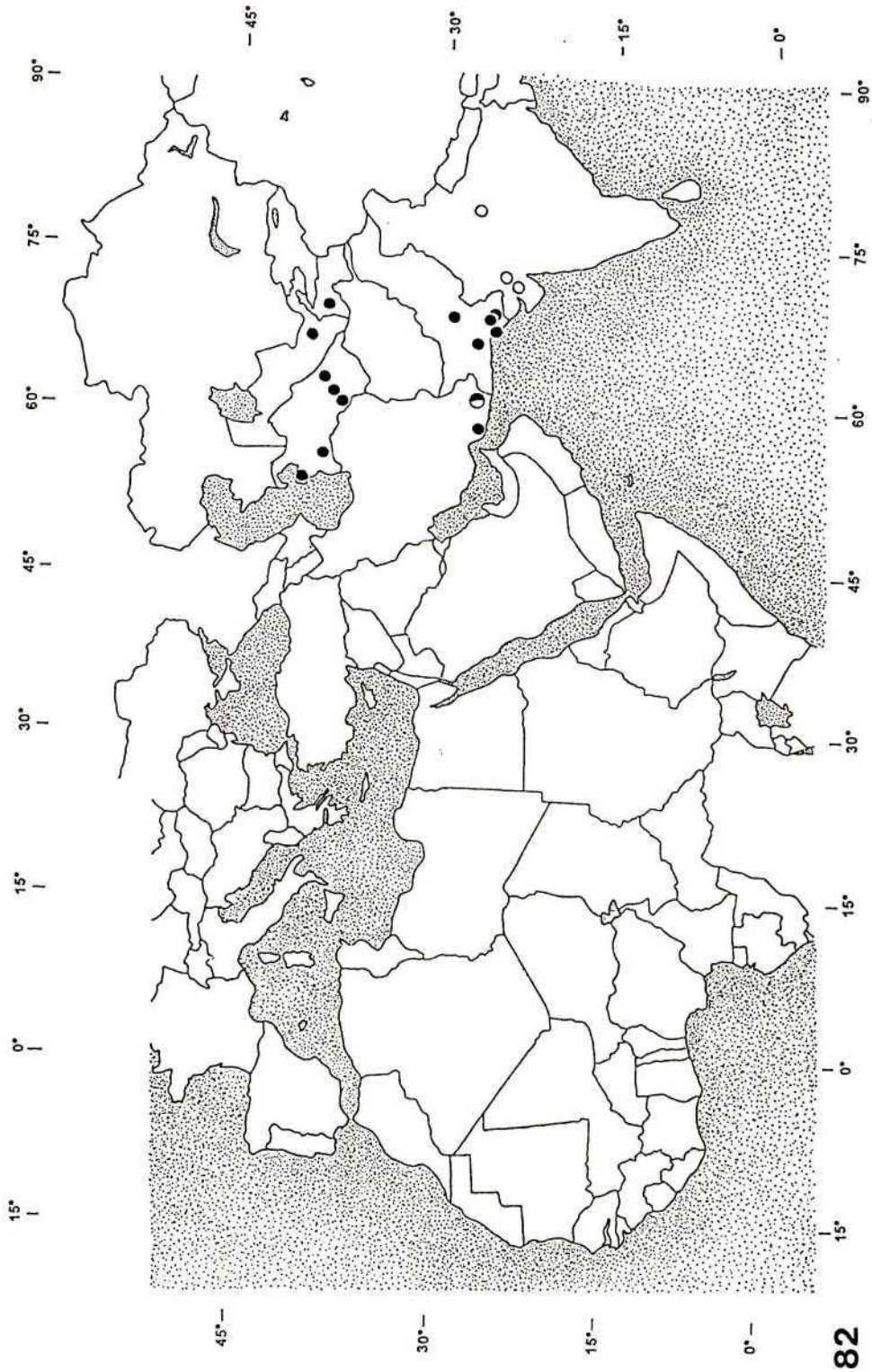
81

Fig. 82. - The distribution of *T. nursei* (○), *T. pallidus* (◑) and *T. asiaticus* (●).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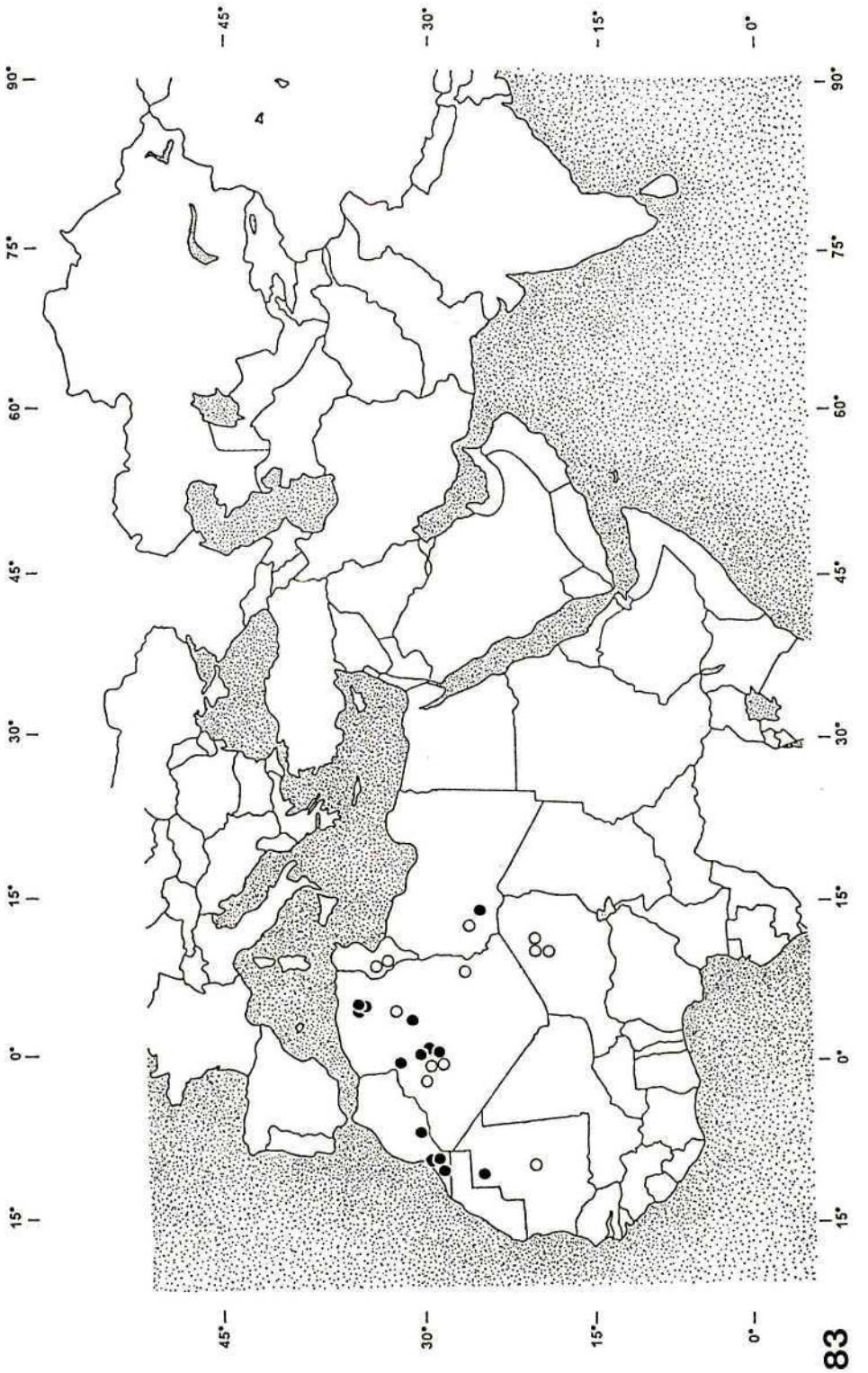
82

Fig. 83. - The distribution of *T. pallidicornis* (○) and *T. sahariсus* (●).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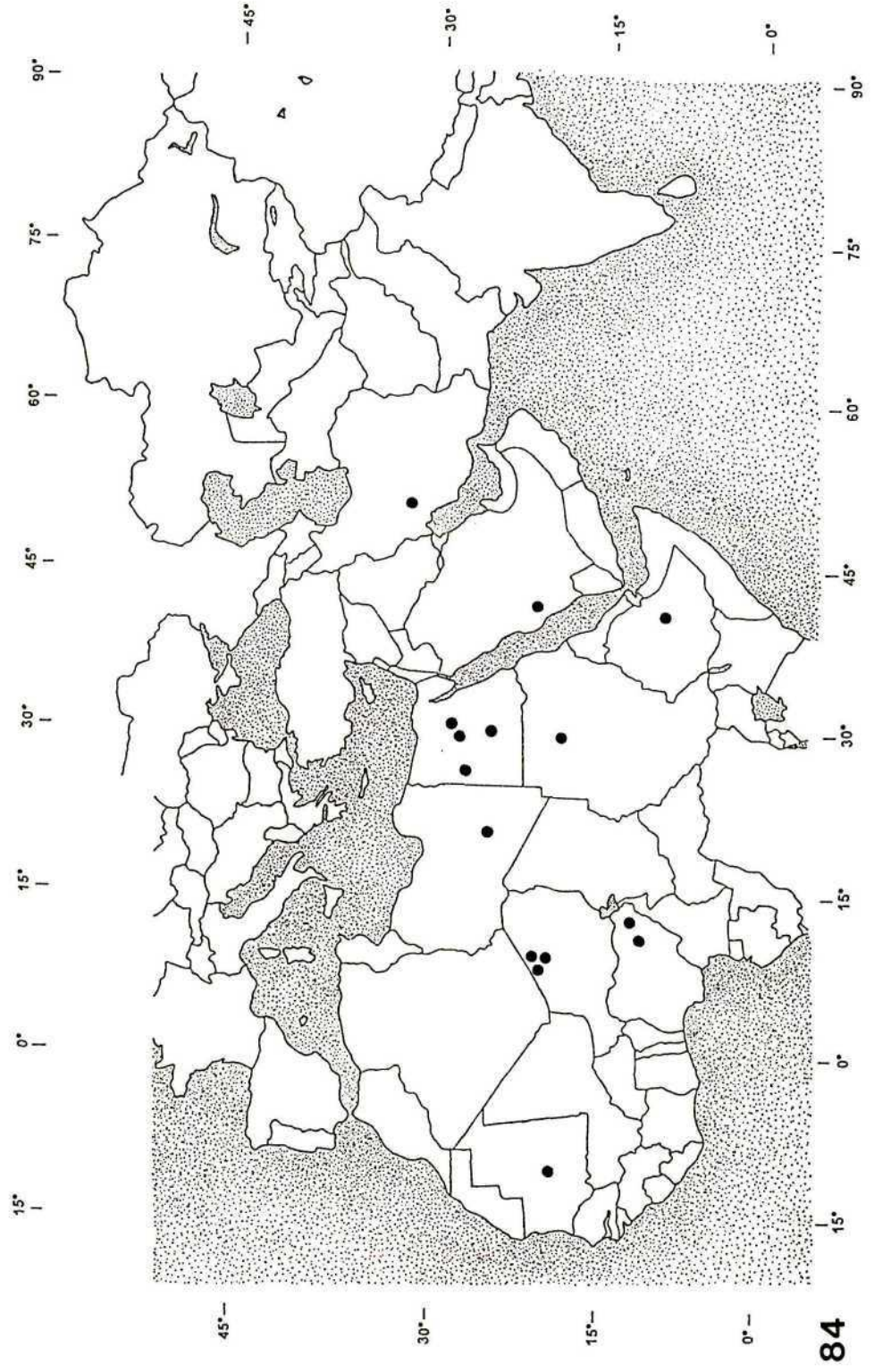
83

Fig. 84. - The distribution of *T. niloticus niloticus* (●).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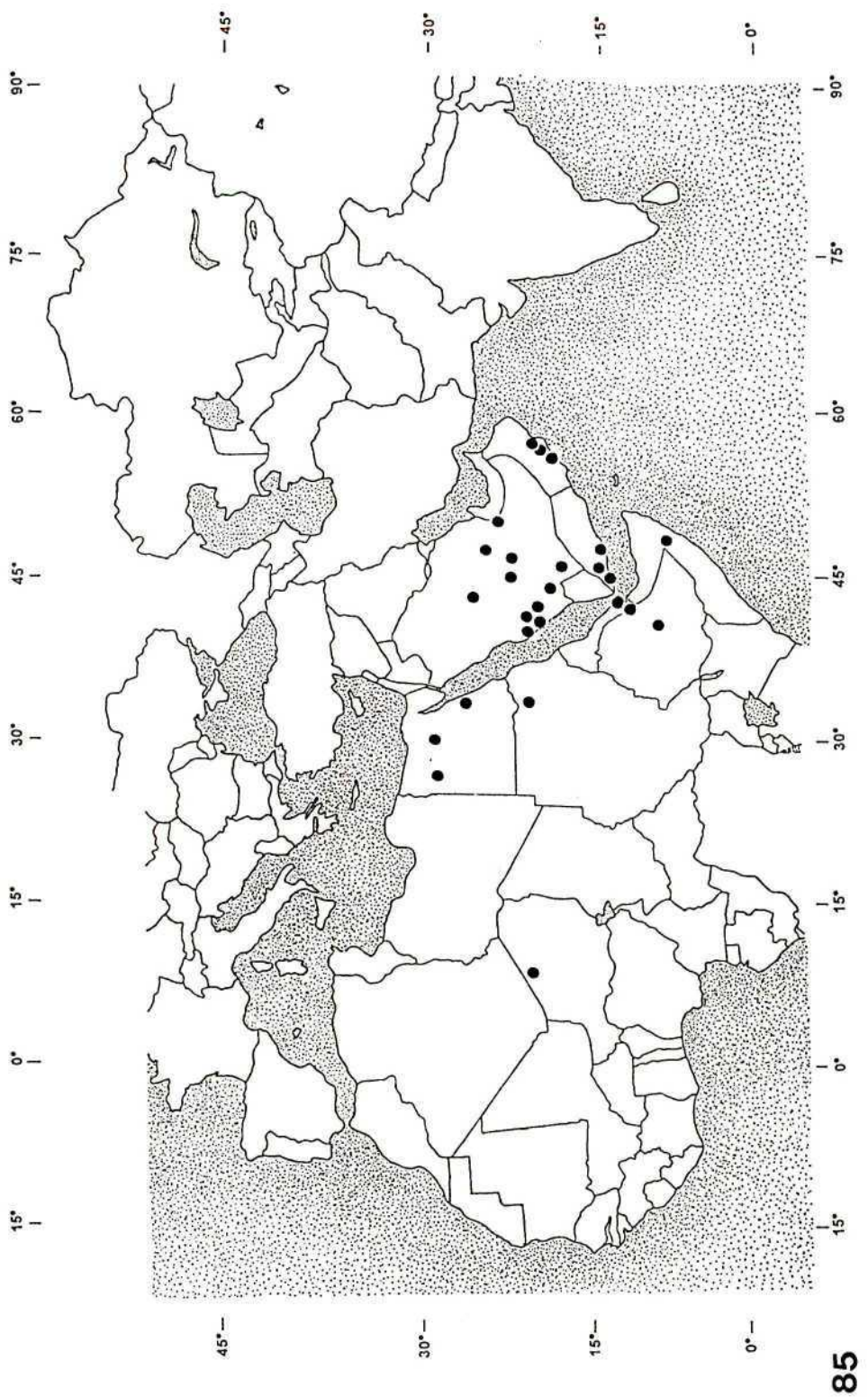
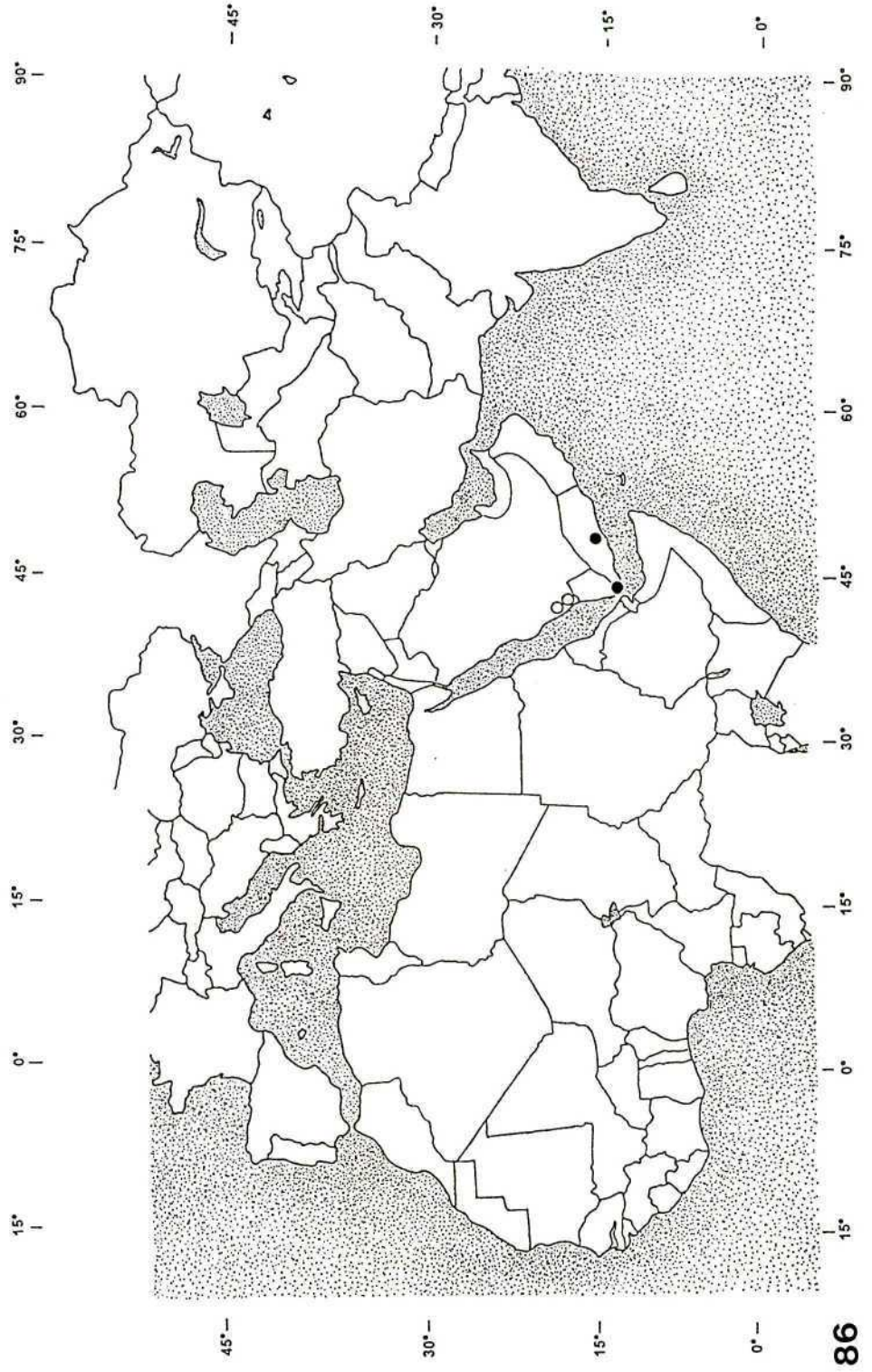
84

Fig. 85. - The distribution of *T. arabicus* (●).



85

Fig. 86. - The distribution of *T. scorteccii* (○) and *T. indistinctus* (●).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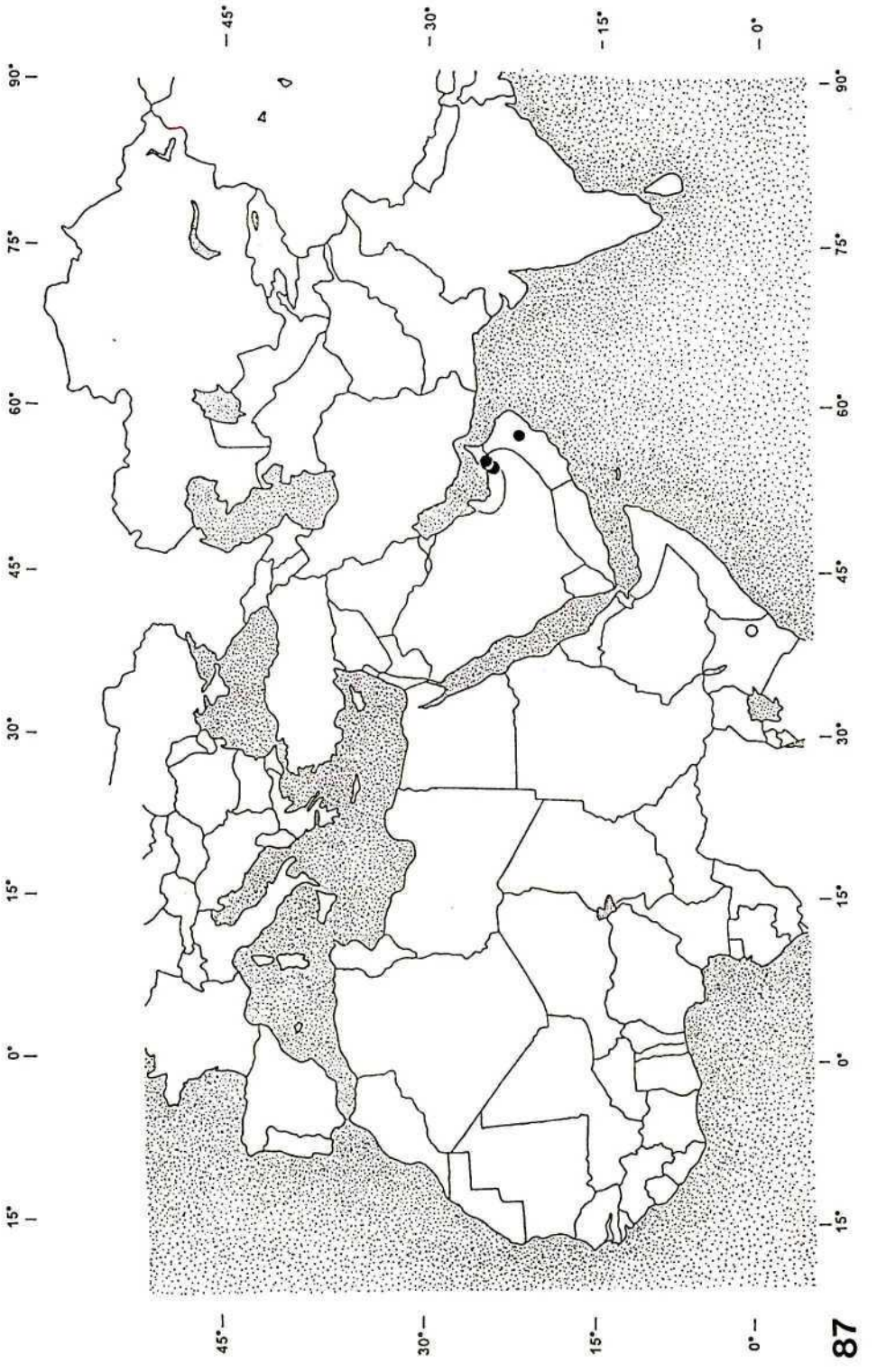
86

Fig. 87. - The distribution of *T. parallelus* (○) and *T. luridus* (●).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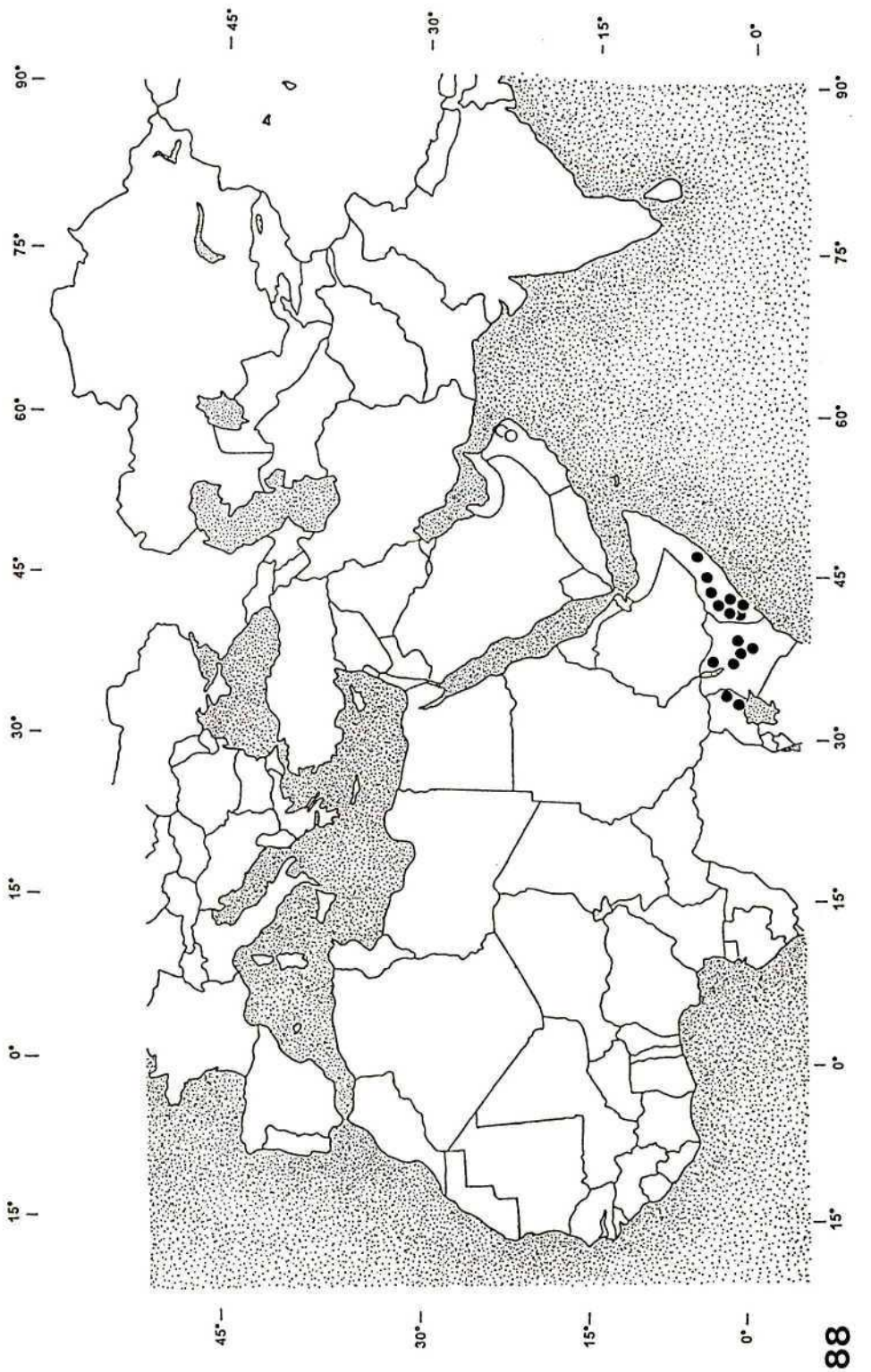
87

Fig. 88. - The distribution of *T. protuberans* (○) and *T. pedunculatoides* (●).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30°
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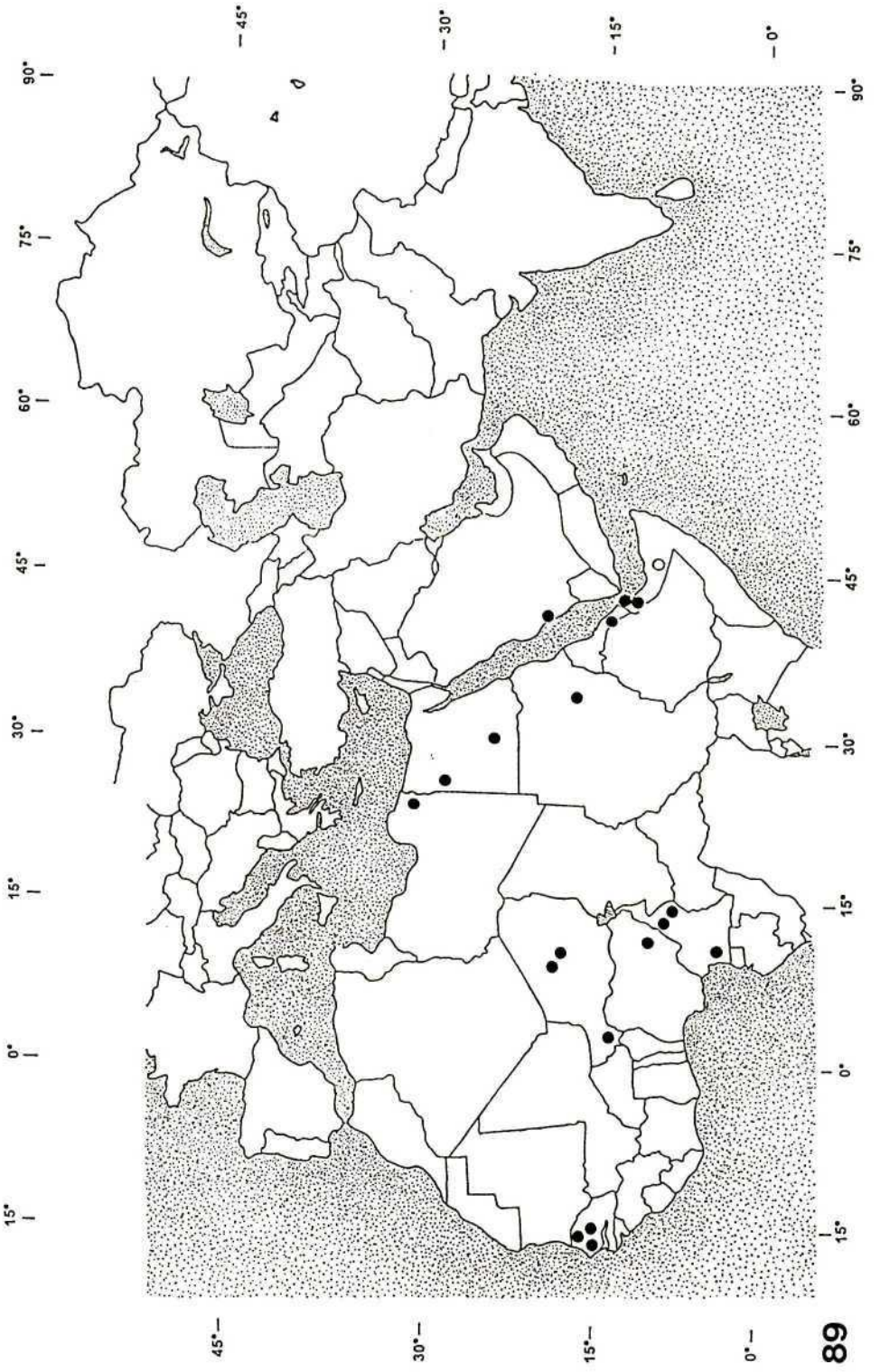
0°
88

Fig. 89. - The distribution of *T. sinuatus* (○) and *T. sudanensis* (●).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30°
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0°
89

Fig. 90. - The distribution of *T. pedunculatus* (○) and *T. palaestinensis* (●).

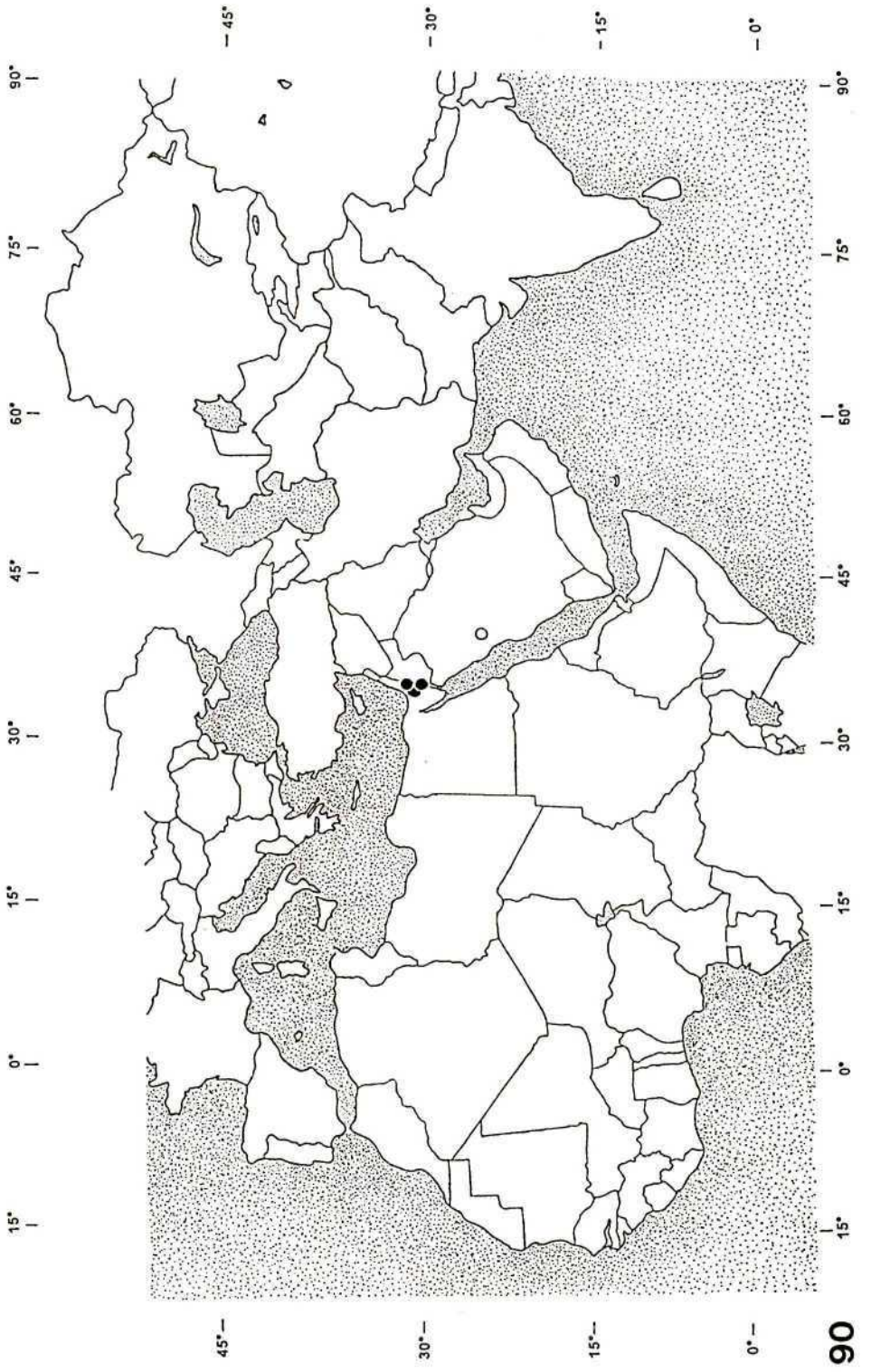
90°
75°
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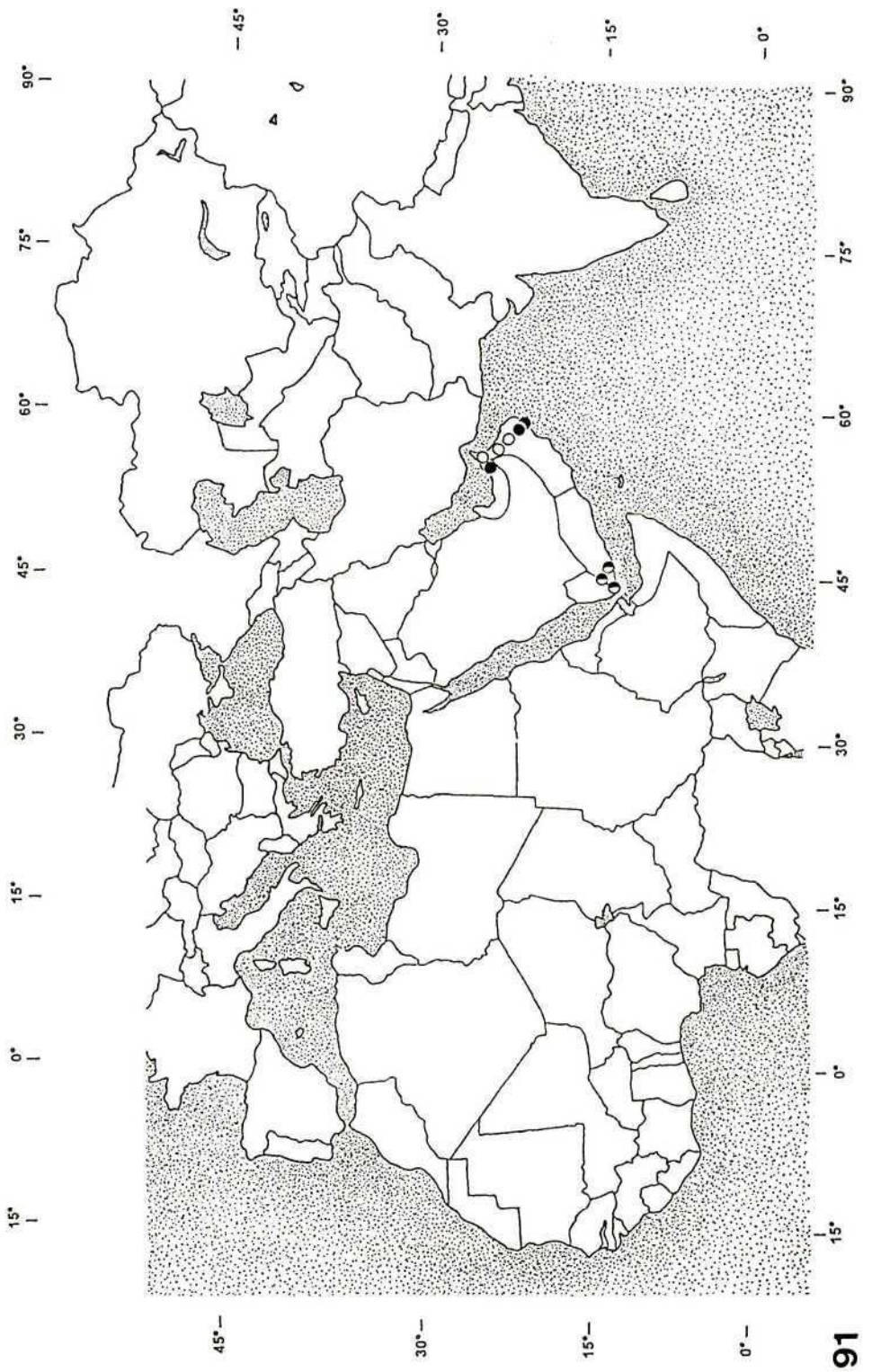
Fig. 91. - The distribution of *T. femoralis* (○), *T. chloroticus* (◑) and *T. trochantalis* (●).



91

Fig. 92. - The distribution of *T. brothersi* (○) and *T. nonveilleri* (●).

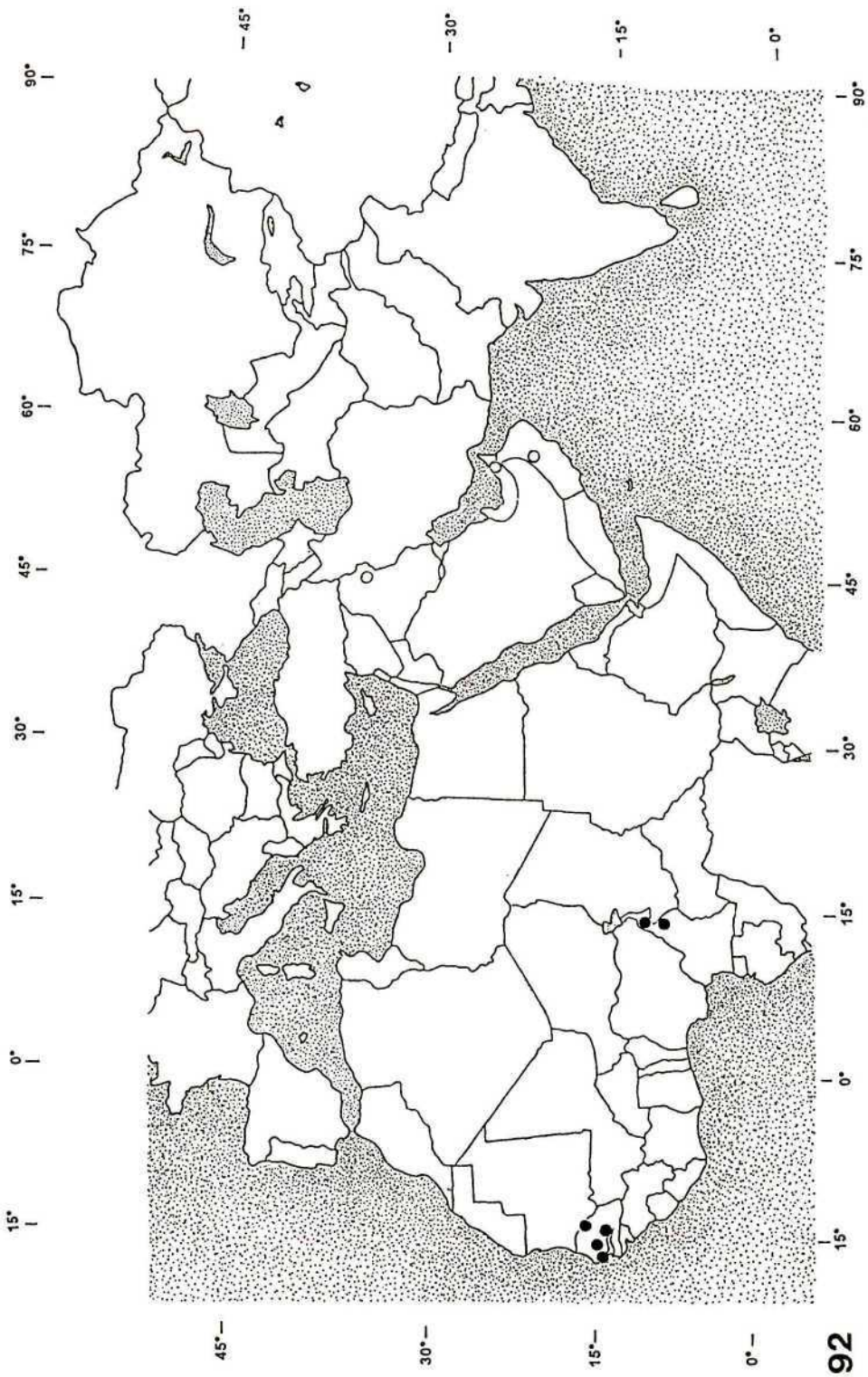

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Fig. 93. - The distribution of *T. ferrugineus* (○) and *T. mandibularis* (●).

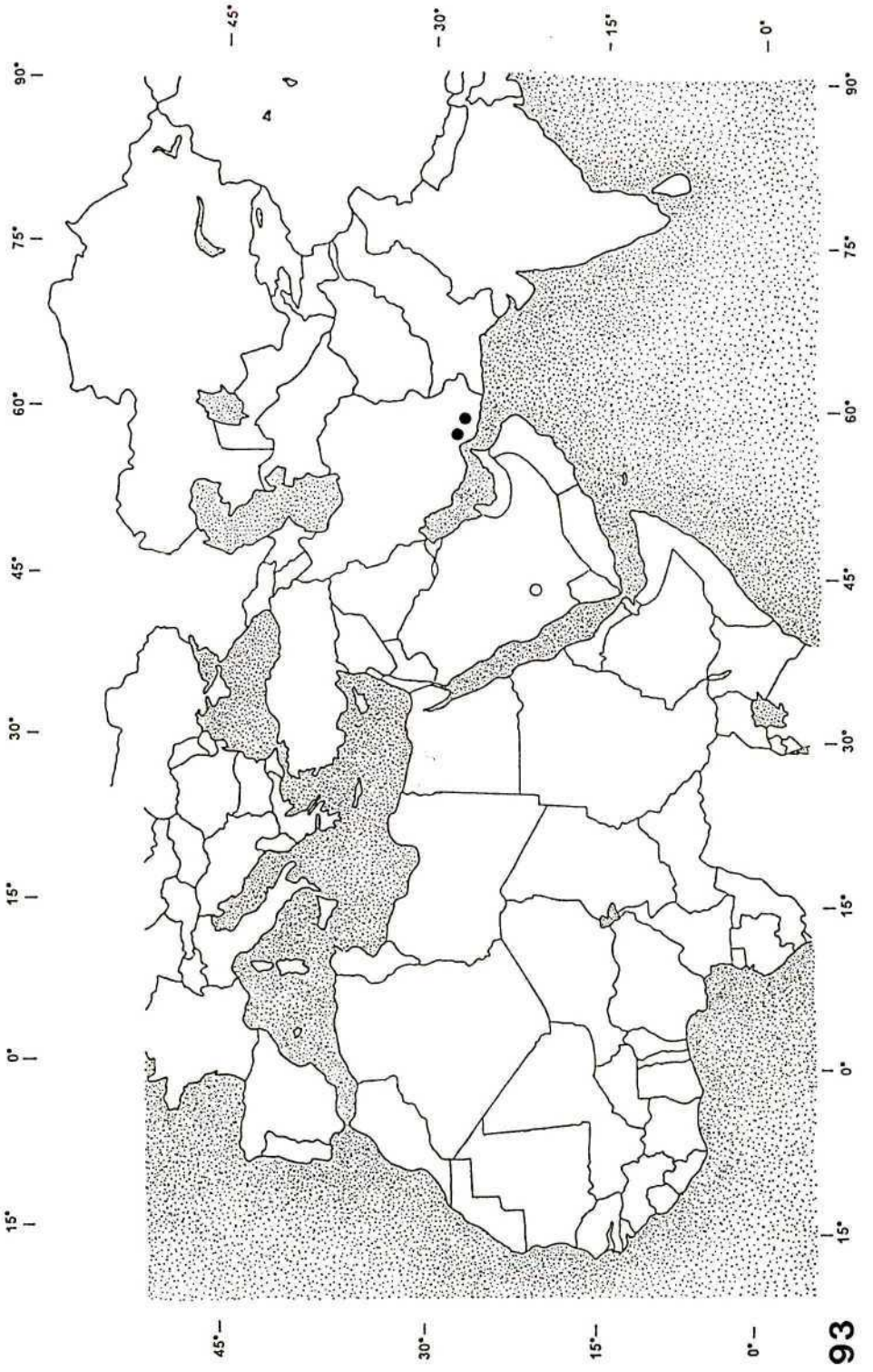
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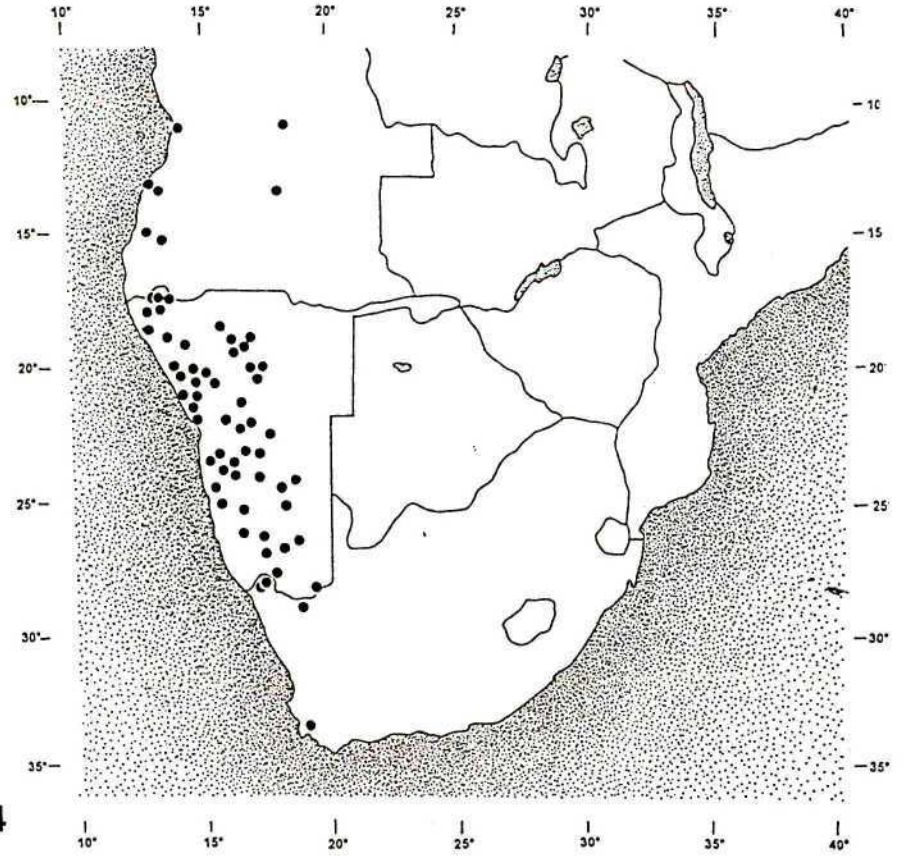
Fig. 94. - The distribution of *T. carinifer* (●).

Fig. 95. - The distribution of *T. alveolus* (○) and *T. thisbe* (●).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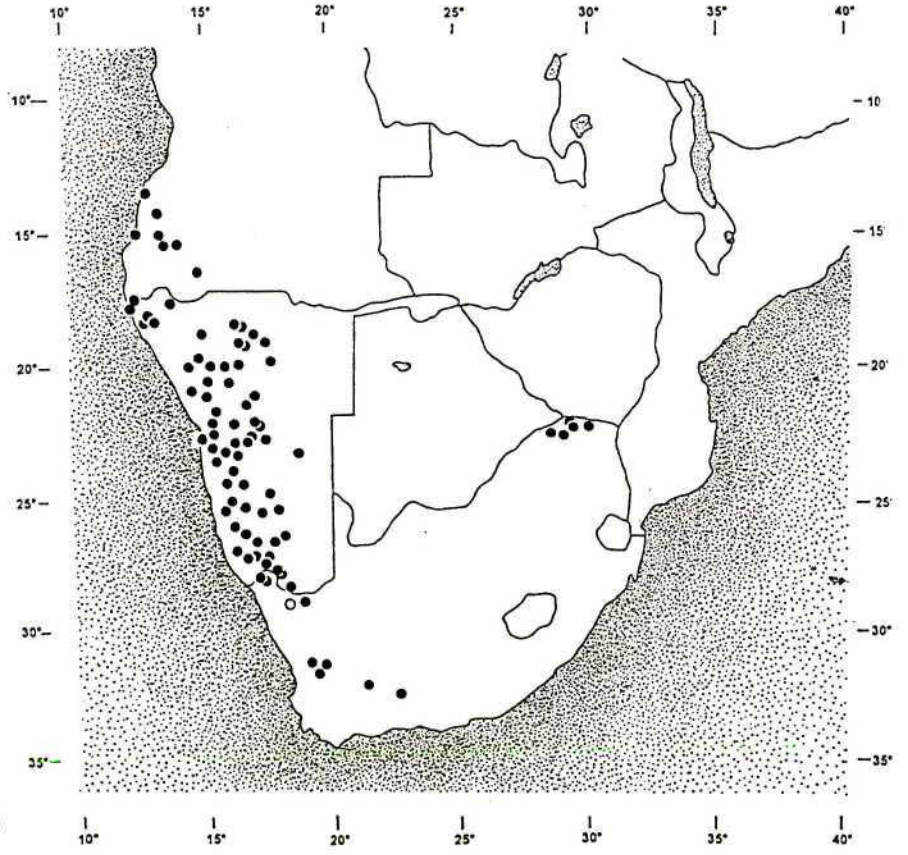
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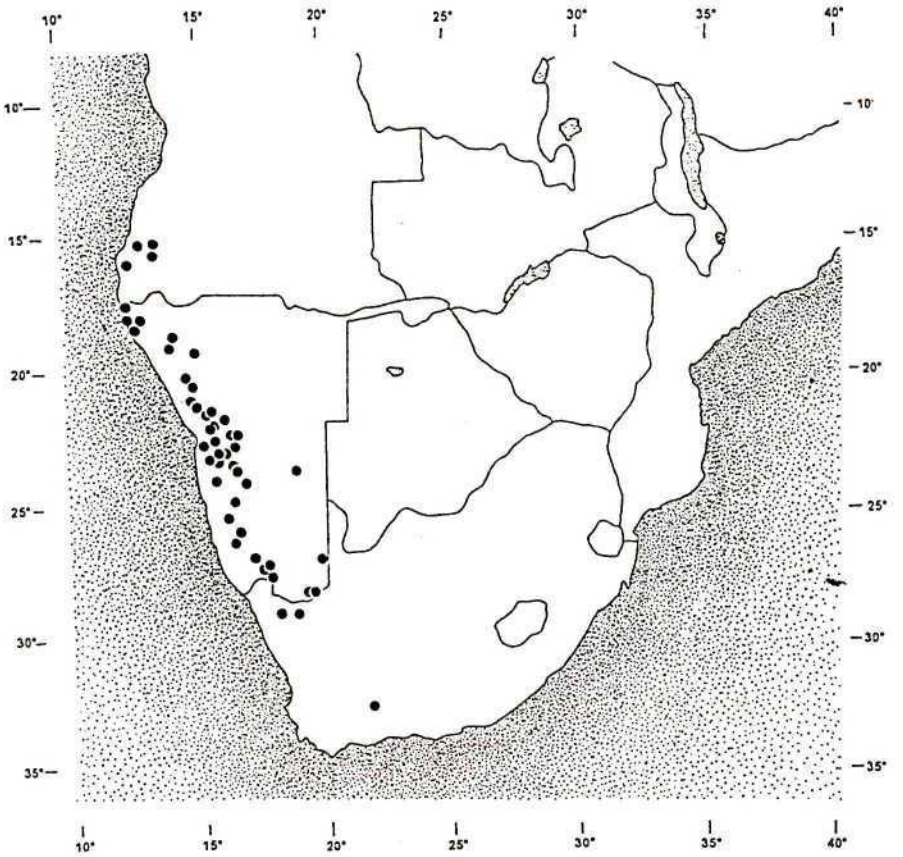
Fig. 96. - The distribution of *T. thisboides* (●).

Fig. 97. - The distribution of *T. longicarinatus* (○) and *T. convexus* (●).



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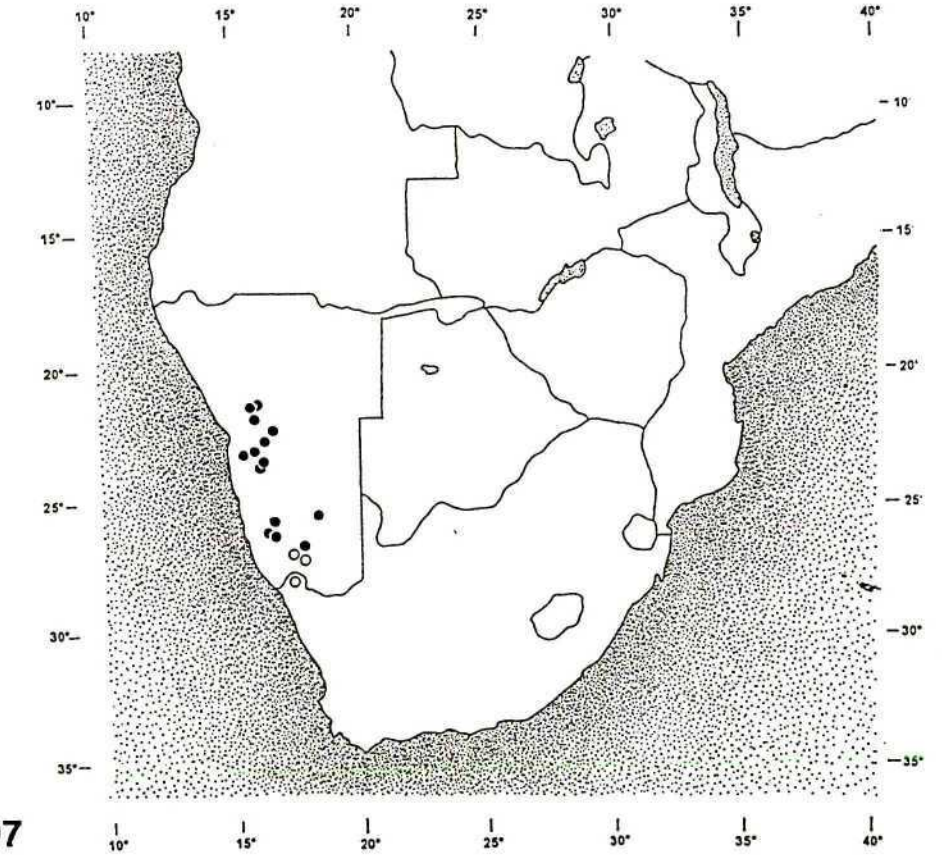
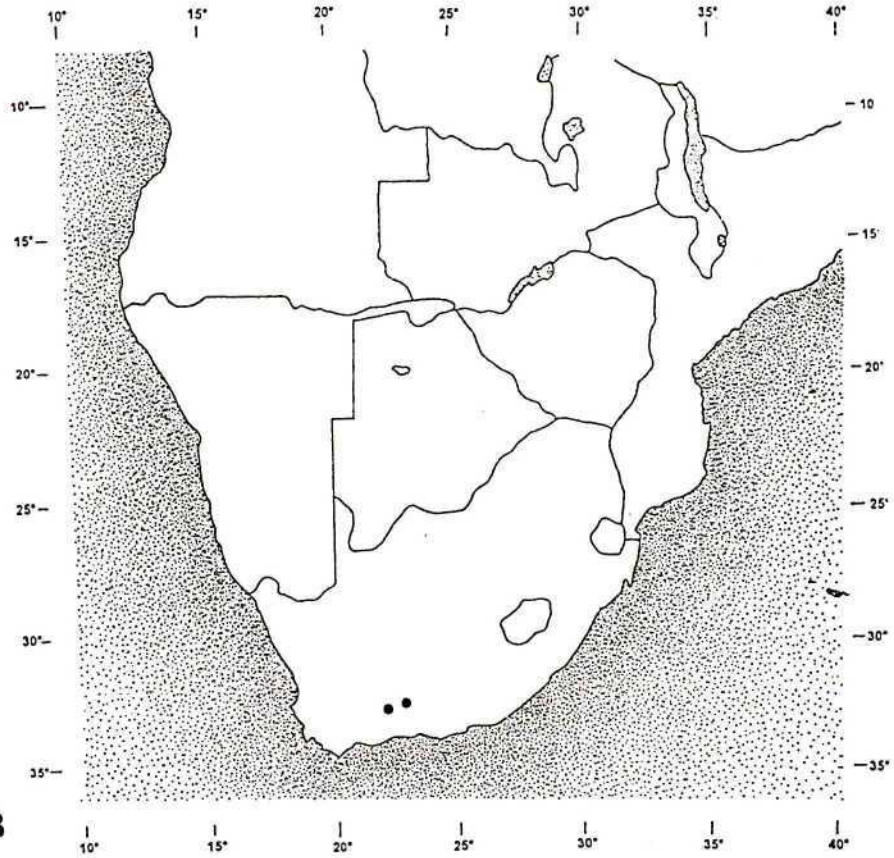


97

Fig. 98. - The distribution of *T. paulocellatus* (●).

Fig. 99. - The distribution of *T. signatipennis* (●).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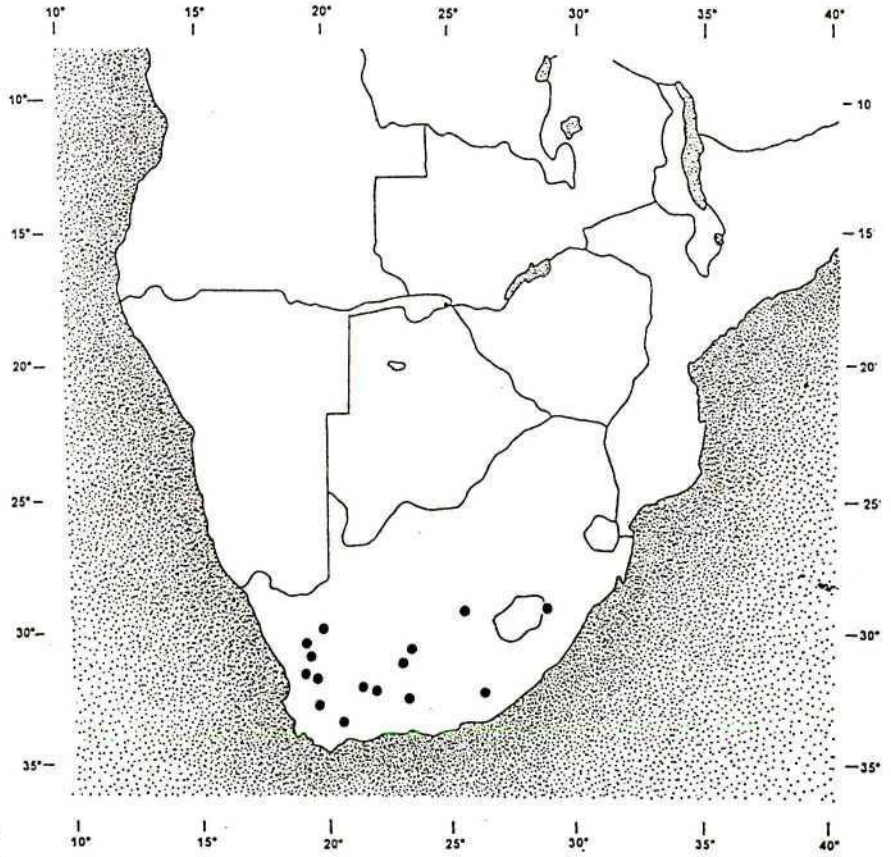
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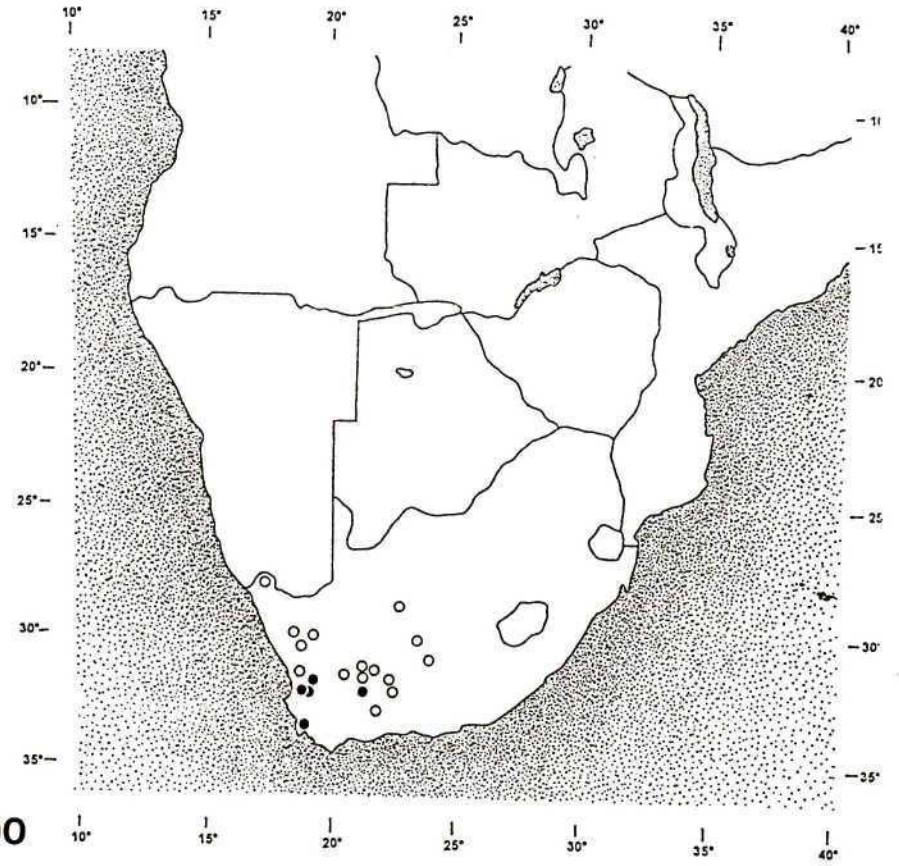
Fig. 100. - The distribution of *T. stigmaticus* (○) and *T. andrei* (●).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